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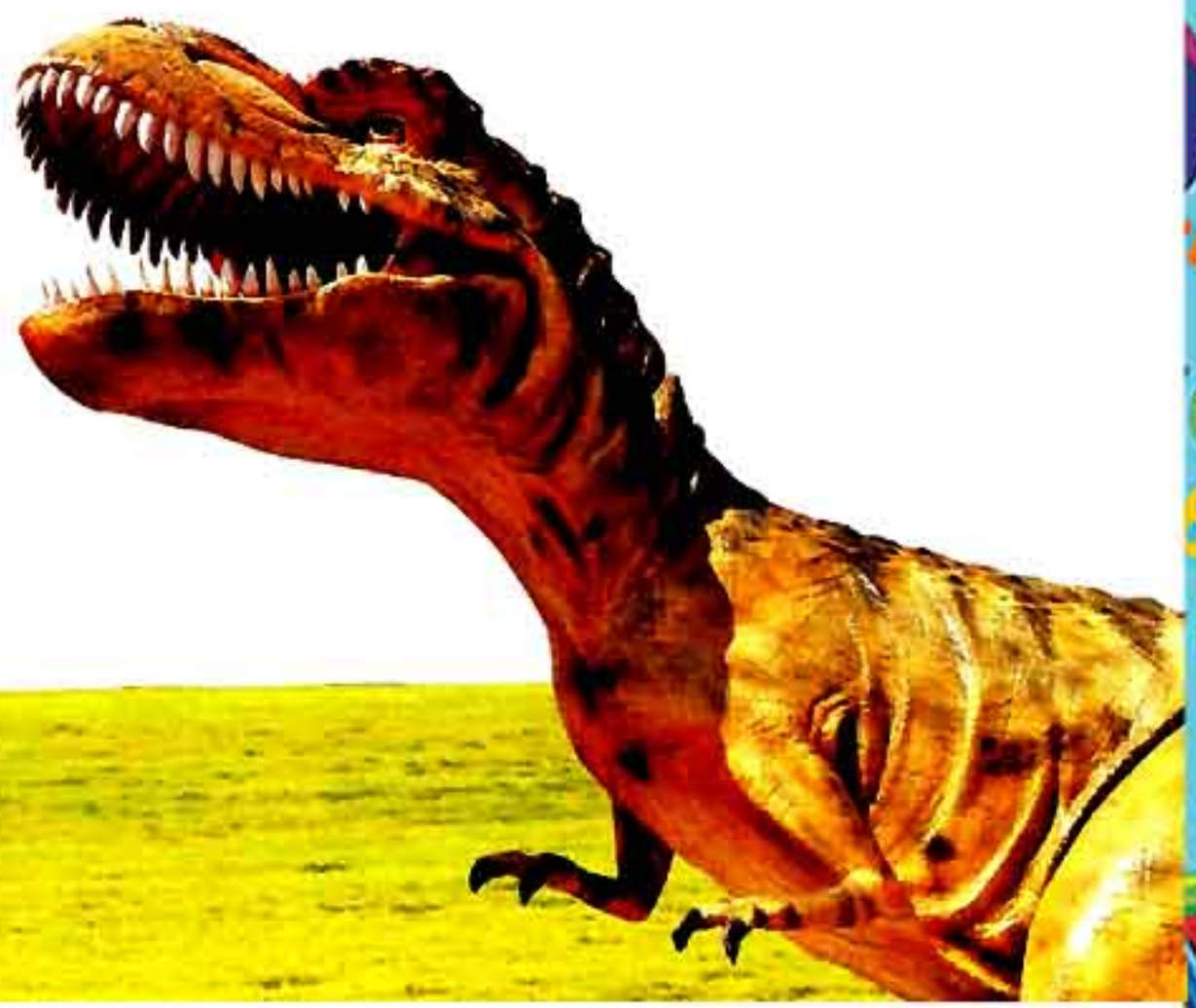
1 UNIT
**Periodicity of elements and their properties**
1. Attempts of Elements Classification.
2. Graduation of the Properties of Elements in the Modern Periodic Table.
3. Main Groups in the Modern Periodic Table.
4. Water.



2 UNIT
**The Atmosphere and protecting planet Earth**
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3 UNIT
**Fossils and Protecting Species from Extinction**
1. Fossils.
2. Extinction.

Glossary



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UNIT

1

# Periodicity of Elements and their Properties



## Lessons of the unit :

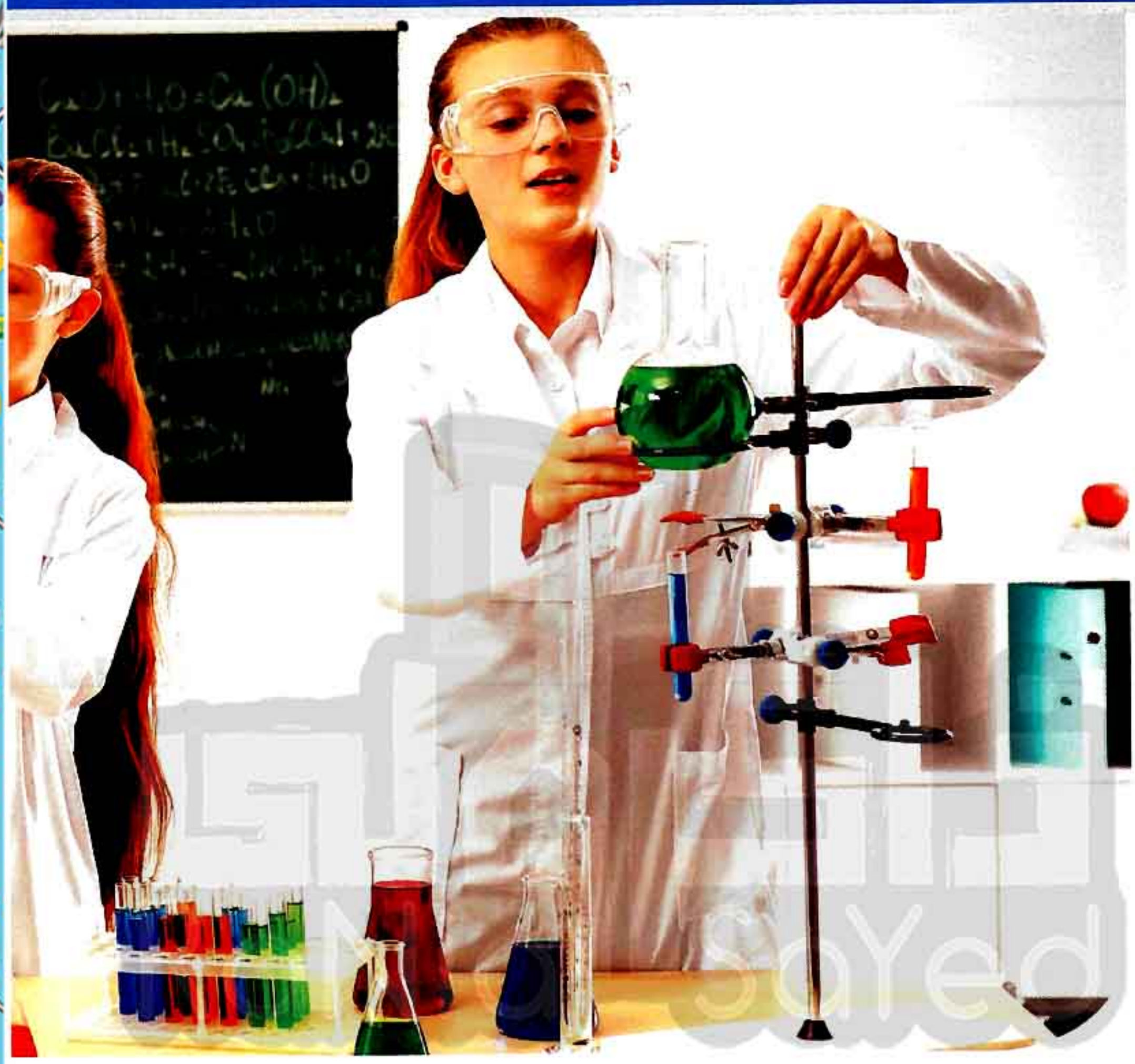
1. Attempts of Elements Classification.
2. Graduation of Properties of Elements in the Modern Periodic Table.
3. Main Groups in the Modern Periodic Table.
4. Water.

## Unit Objectives :

**By the end of this unit, student will be able to :**

- Follow the efforts and attempts of some scientists to classify elements (Mendeleev - Moseley - Modern Periodic Table).
- Recognize the principles of elements classification in the modern periodic table.
- Estimate scientists' efforts in discovering, classifying and investing elements.
- Determine the location and properties of some elements in the modern periodic table by recognizing their atomic numbers.
- Compare between the properties of groups and periods in the modern periodic table.
- Compare between metals, nonmetals, semimetals and inert gases from their electronic configuration and chemical activity.
- Describe main groups in the modern periodic table.
- Describe elements properties and their uses.
- Use tools, materials and instruments in studying elements properties.

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- Determine the chemical and natural properties of water.
- Explain the irregularity of the natural properties of water.
- Describe the chemical bonds among the atoms and molecules of water (covalent and hydrogen).
- Recognize the polarization of some chemical compounds (Water-Ammonia).
- Recognize the electrolysis of water.
- Explain the equivalence of water.
- Describe how water reacts with some of the elements of chemical activity series.
- Determine water pollutants and their bad effects.
- Determine the methods and measures of protecting water from pollution.
- Determine his/her personal responsibilities to protect water from pollution.
- Take needed decisions to protect water from pollution.

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LESSON 1

# Attempts of Elements Classification




## How

can you study the properties of elements in a simple way ?

**Many attempts are made by scientists for the classification of elements in order to :**

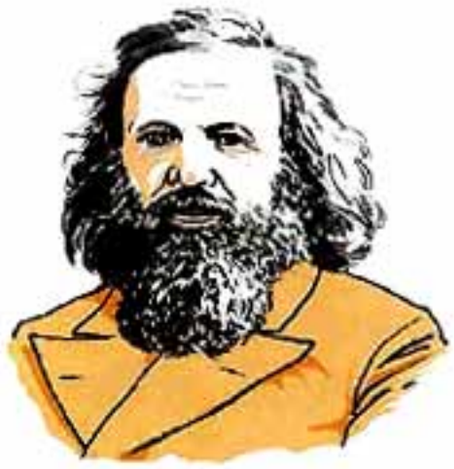
- ***Facilitate their study.***
- ***Find a relationship between elements and their chemical and physical properties.***

## The most important attempts are

1. Mendeleev's periodic table.
2. Moseley's periodic table.
3. Modern periodic table.

## 1 Mendeleev's periodic table :

- It is the first real periodic table for classifying elements.
- At this time, only 67 elements were known.
- Mendeleev explained his periodic table in his book "Principles of Chemistry" in 1871.



Russian scientist Mendeleev



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Lesson One

## ★ How Mendeleev classified elements :



**1.** He prepared 67 cards, each card represented an element.

**2.** He recorded the name of each element on each card with its atomic weight and its important properties (boiling point, melting point, density, symbol of oxide, ...).

**3.** He arranged elements of similar properties in vertical columns which were known later as **groups**.

**4.** He classified the elements of each main group into two subgroups (A & B) (due to the differences between their properties).

**5. He discovered that :**

- The atomic weights of elements increase in an ascending order on moving from the left side of the table to the right side in horizontal rows which were known later as **periods**.
- The properties of elements were repeated periodically by the beginning of each new period.

## ➲ Advantages of Mendeleev's table :

1. He left gaps (empty cells) in his table predicting the discovery of new elements, where the atomic weights of elements increase in non-uniform way.
2. He corrected the atomic weights of some elements, which were estimated wrongly.

### ▸ Enrichment information

- *In 1871, Mendeleev predicted the properties of an unknown element and named it ICA silicon. This element was discovered later in 1886 and was named Germanium (Ge) and its properties were the same as Mendeleev had predicted.*



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UNIT 1

### Disadvantages of Mendeleev's table

1. He had to make a disturbance in the ascending order of atomic weights of some elements to put them in groups that suit their properties.
2. He had to deal with the isotopes of one element as different elements due to the difference in their atomic weights.

GR. ***Mendeleev had to put more than one element in one cell as iron, cobalt and nickel.***
Due to the similarity in their properties.

**Enrichment information**

- *Some elements have many forms having the same atomic number but differ in atomic weights known as Isotopes, as the isotopes of hydrogen:* ${}^{1}_{1}H$ , ${}^{2}_{1}H$ , ${}^{3}_{1}H$.

## 2 Moseley's periodic table :

### In 1913 :

- The Newzealand scientist Rutherford discovered that the nucleus of the atom contains positively charged protons.


Rutherford

- In the same year the English scientist Moseley discovered after studying X-rays properties, that the periodicity of elements properties is related to their atomic numbers and not to their atomic weights as Mendeleev believed.


Moseley

**Enrichment information**

***Among the discoveries which have helped Moseley to put his periodic table are :***

*1. Radiation activity phenomena.* *2. Getting of x-rays.*

*3. More knowledge about the arrangement of electrons in atoms.*

### The most important modifications of Moseley on Mendeleev's table :

1. He arranged elements in an ascending order according to their atomic numbers, where the atomic number of each element increases by **one** from the preceding element in the same period.
2. He added zero group which includes inert (noble) gases to the table.
3. He specified a place below the table for lanthanides and actinides elements.

TRY TO ANSWER worksheet in the Notebook 1



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Lesson One

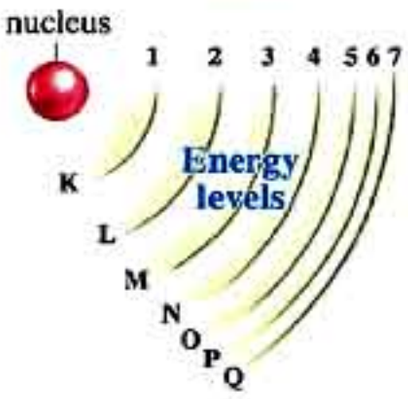
## 3 Modern periodic table :

- **The recent studies led to the identification of the accurate composition of the atoms, where :**

- The Danish scientist **Bohr** had discovered the **main energy levels** of the atom (as shown in the figure) and their number reaches 7 in the heaviest atoms known till now.



Bohr




- Scientists had discovered that each main level contains a definite number of other levels known as ***energy sublevels***, they reclassified the elements in a table known as ***"Modern periodic table"***.

- Elements are classified in the modern periodic table in an ascending order according to :
  - their atomic numbers.
  - the way of filling the energy sublevels with electrons.

**▸ Enrichment information**

*Each main energy level contains a number of sublevels equals to its number (**i.e.** first level (K) contains one sublevel, while fourth level (N) contains four sublevels which are : s , p , d and f.)*

**➲ We can summarize the previous attempts of elements classification as follows :**

**Attempts of elements classification**

| Mendeleev's periodic table | Moseley's periodic table | Modern periodic table |
|---|---|---|
| Elements are classified in an ascending order according to their atomic weights. | Elements are classified in an ascending order according to their atomic numbers. | Elements are classified in an ascending order according to :<br>• their atomic numbers.<br>• the way of filling the energy sublevels with electrons. |

## Description of the modern periodic table :

- The number of known elements in the modern periodic table till now is **118** elements, **92** elements are abundant (available) in Earth's crust, while the rest are prepared artificially.

**▸ Enrichment information**

*The recently discovered elements do not exist in nature, but they are prepared artificially from other elements. They are radioactive elements, whose nuclei disintegrate in less than a second.*



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UNIT 1

s-block elements

p-block elements

d-block elements

f-block elements

Lanthanides

Actinides

No. of period

6 — Atomic number
C — Symbol
Carbon — Name
12 — Atomic mass

| No. of period | gp. (1A) | gp. (2A) | gp. (3B) | gp. (4B) | gp. (5B) | gp. (6B) | gp. (7B) | gp. (8) | gp. (8) | gp. (8) | gp. (1B) | gp. (2B) | gp. (3A) | gp. (4A) | gp. (5A) | gp. (6A) | gp. (7A) | gp. (0) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 H Hydrogen 1 | | | | | | | | | | | | | | | | | 2 He Helium 4 |
| 2 | 3 Li Lithium 7 | 4 Be Beryllium 9 | | | | | | | | | | | 5 B Boron 10.81 | 6 C Carbon 12 | 7 N Nitrogen 14 | 8 O Oxygen 16 | 9 F Fluorine 19 | 10 Ne Neon 20 |
| 3 | 11 Na Sodium 23 | 12 Mg Magnesium 24 | | | | | | | | | | | 13 Al Aluminum 27 | 14 Si Silicon 28 | 15 P Phosphorus 31 | 16 S Sulphur 32 | 17 Cl Chlorine 35.5 | 18 Ar Argon 40 |
| 4 | 19 K Potassium 39 | 20 Ca Calcium 40 | 21 Sc Scandium 44.9 | 22 Ti Titanium 47.88 | 23 V Vanadium 50.94 | 24 Cr Chromium 52 | 25 Mn Manganese 54.94 | 26 Fe Iron 55.84 | 27 Co Cobalt 58.93 | 28 Ni Nickel 58.69 | 29 Cu Copper 63.55 | 30 Zn Zinc 65.39 | 31 Ga Gallium 69.72 | 32 Ge Germanium 72.64 | 33 As Arsenic 74.92 | 34 Se Selenium 78.96 | 35 Br Bromine 80 | 36 Kr Krypton 83.8 |
| 5 | 37 Rb Rubidium 85.47 | 38 Sr Strontium 87.62 | 39 Y Yttrium 88.9 | 40 Zr Zirconium 91.22 | 41 Nb Niobium 92.9 | 42 Mo Molybdenum 95.94 | 43 Tc Technetium 98 | 44 Ru Ruthenium 101.1 | 45 Rh Rhodium 102.9 | 46 Pd Palladium 106.42 | 47 Ag Silver 107.9 | 48 Cd Cadmium 112.4 | 49 In Indium 114.8 | 50 Sn Tin 118.7 | 51 Sb Antimony 121.75 | 52 Te Tellurium 127.6 | 53 I Iodine 127 | 54 Xe Xenon 131.3 |
| 6 | 55 Cs Cesium 132.9 | 56 Ba Barium 137.3 | 57 La Lanthanum 138.9 | 72 Hf Hafnium 178.5 | 73 Ta Tantalum 180.9 | 74 W Tungesten 183.84 | 75 Re Rehnium 186.2 | 76 Os Osmium 190.23 | 77 Ir Iridium 192.22 | 78 Pt Platinum 195.1 | 79 Au Gold 197 | 80 Hg Mercury 200.6 | 81 Tl Thallium 204.4 | 82 Pb Lead 207.2 | 83 Bi Bismuth 209 | 84 Po Polonium 209 | 85 At Astatine 210 | 86 Rn Radon 222 |
| 7 | 87 Fr Francium 223 | 88 Ra Radium 226 | 89 Ac Actinium 227 | 104 Rf Rutherfordium 261 | 105 Db Dubnium 262 | 106 Sg Seaborgium 266 | 107 Bh Bohrium 264 | 108 Hs Hassium 269 | 109 Mt Meitnerium 268 | 110 Ds Darmstadtium 281 | 111 Rg Roentgenium 272 | 112 Cn Copernicium 277 | 113 Uut Ununtrium 284 | 114 Fl Flerovium 289 | 115 Uup Ununpentium 288 | 116 Lv Livermorium 293 | 117 Uus Ununseptium (unknown) | 118 Uuo Ununoctium (unknown) |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lanthanides | 58 Ce Cerium 140.1 | 59 Pr Praseodymium 140.9 | 60 Nd Neodymium 144.24 | 61 Pm Promethium 145 | 62 Sm Samarium 150.36 | 63 Eu Europium 152 | 64 Gd Gadolinium 157.25 | 65 Tb Terbium 158.9 | 66 Dy Dysprosium 162.5 | 67 Ho Holmium 164.9 | 68 Er Erbium 167.3 | 69 Tm Thulium 168.9 | 70 Yb Ytterbium 173 | 71 Lu Lutetium 175 |
| Actinides | 90 Th Thorium 232 | 91 Pa Protactinium 231 | 92 U Uranium 238 | 93 Np Neptunium 237 | 94 Pu Plutonium 244 | 95 Am Americium 243 | 96 Cm Curium 247 | 97 Bk Berkelium 247 | 98 Cf Californium 251 | 99 Es Einsteinium 252 | 100 Fm Fermium 257 | 101 Md Mendelevium 258 | 102 No Nobelium 259 | 103 Lr Lawrencium 262 |

**Metals**
- Alkali metals
- Alkaline earth metals
- Transition metals
- Other metals

**Metalloids**
- Metalloids

**Nonmetals**
- Halogens
- Other nonmetals

**Noble gases**
- Inert gases

## ➲ The modern periodic table consists of :

- 7 horizontal periods, where each period statrs by filling a new energy level.
- 18 vertical groups, where each group has a modern number and a traditional number.
- The elements of modern periodic table are classified into 4 blocks :

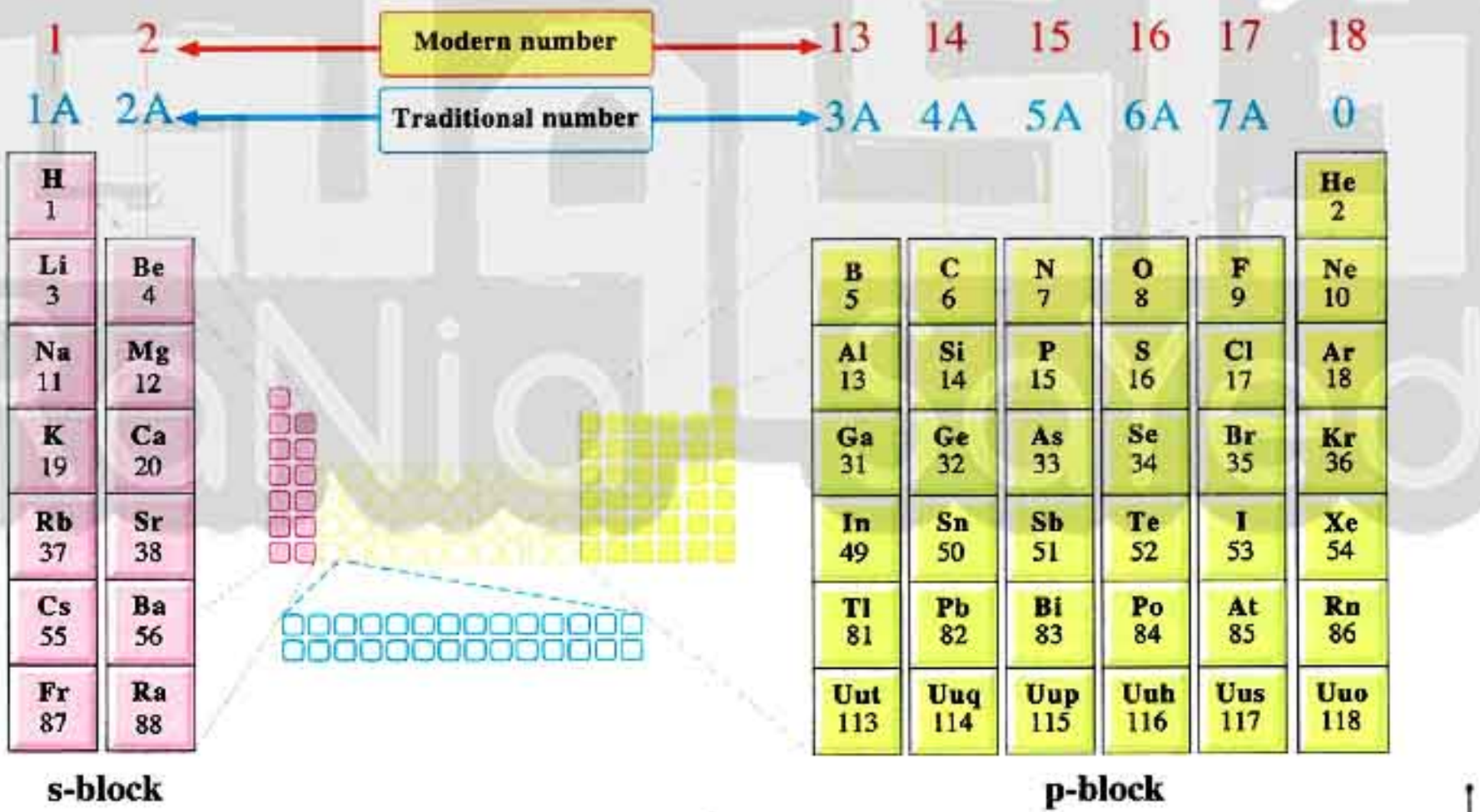
**1** s-block , **2** p-block , **3** d-block , **4** f-block ,

### 1 s-block

- They are located on the **left side** of the periodic table.
- All groups of s-block take letter "A"
- They are arranged in **two** groups (1A) and (2A).

### 2 p-block

- They are located on the **right side** of the periodic table.
- All groups of p-block take letter "A" except zero group (18) "Nobel gases".
- They are arranged in **six** groups (3A), (4A), (5A), (6A), (7A) and zero group.




The position of s-block elements and p-block elements in the modern periodic table.

**Note**

**The outermost energy level of all nobel gases, is completely filled with 8 electrons except Helium with 2 electrons because it contains only one energy level (K level).**



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UNIT 1

## 3 d-block

- They are located in the middle of the periodic table.
- All groups in d-block take letter "B" except group (8).
- They are arranged in **ten** groups (3B), (4B), (5B), (6B), (7B), (8) which contains 3 vertical columns , (1B) and (2B).
- They start to appear from period (4).
- They are known as **transition elements**.
- They separate between s-block elements (left side of the table) and p-block elements (right side of the table).




The position of d-block elements in the modern periodic table.

## 4 f-block

- They are located below the periodic table.
- They include **lanthanides and actinides**.



| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lanthanides | Ce 58 | Pr 59 | Nd 60 | Pm 61 | Sm 62 | Eu 63 | Gd 64 | Tb 65 | Dy 66 | Ho 67 | Er 68 | Tm 69 | Yb 70 | Lu 71 |
| Actinides | Th 90 | Pa 91 | U 92 | Np 93 | Pu 94 | Am 95 | Cm 96 | Bk 97 | Cf 98 | Es 99 | Fm 100 | Md 101 | No 102 | Lr 103 |

The position of f-block elements in the modern periodic table.



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## Exercise 1

***An element located in group (3B) and period (4),***

***Mention its kind and in which block it belongs to ?***

## Answer

- Its kind : transition element.
- It belongs to : d-block.

## Remember

- The atomic number of an element equals the sum of the numbers of electrons which rotate in energy levels around the nucleus of its atom.
  **i.e.** the atomic number = number of electrons = number of protons.
- The number of electrons, which saturate the first four energy levels (K, L, M and N) can be calculated from the relation ($2n^2$), where (n) is the number of energy level therefore :
  **(1)** K level is saturated with 2 electrons.
  **(2)** L level is saturated with 8 electrons.
  **(3)** M level is saturated with 18 electrons.
  **(4)** N level is saturated with 32 electrons.

### ⁂ How to determine the location of groups (A) elements in the modern periodic table by knowing its atomic numbers :

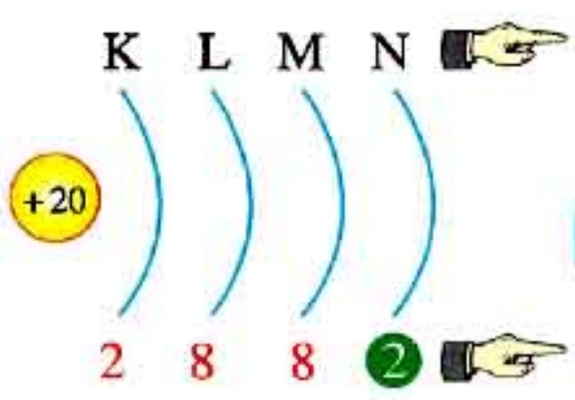
**1. Write the electronic configuration of atom of the element.**

**2. And from this determine :**

- **a** The number of energy levels occupied by electrons. **indicates** → The peroid number of the element
- **b** The number of electrons in the outermost energy level. **indicates** → The traditional group number of the element

## Application

**Determine the location of $_{20}Ca$ in the modern periodic table.**




number of energy levels = 4 energy levels

∴ $_{20}Ca$ locates in period (4)

number of electrons in outermost energy level = 2 electrons

∴ $_{20}Ca$ locates in group (2A)



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UNIT 1

* **In the following table, examples showing the determination of some groups (A) elements location in the modern periodic table :**

| Element | Electronic configuration | Number of energy levels occupied by electrons | Period number | Number of electrons in the outermost energy level | Group number | |
|---|---|---|---|---|---|---|
| | | | | | Traditional | Modern |
| $_8O$ | +8 (K 2, L 6) | 2 | 2 | 6 | 6A | 16 |
| $_{10}Ne$ | +10 (K 2, L 8) | 2 | 2 | 8 | zero | 18 |
| $_{12}Mg$ | +12 (K 2, L 8, M 2) | 3 | 3 | 2 | 2A | 2 |
| $_2He$ | +2 (K 2) | 1 | 1 | 2 | zero | 18 |

GR. ***Helium ($_2He$) is located in zero group, and isn't located in group (2A).***

Because it has only one energy level (K) which is saturated with 2 electrons, so it is a nobel gas locates in zero group (group 18).

**Question** **Complete the following table :**

| Element | Electronic configuration | Number of energy levels occupied by electrons | Period number | Number of electrons in the outermost energy level | Group number | | Block |
|---|---|---|---|---|---|---|---|
| | | | | | Traditional | Modern | |
| $_{15}P$ | +15 (K ... L ... M ...) | ..... | ..... | ..... | ..... | ..... | ..... |
| $_{18}Ar$ | +18 (K ... L ... M ...) | ..... | ..... | ..... | ..... | ..... | ..... |
| $_{19}K$ | +19 (K ... L ... M ... N ...) | ..... | ..... | ..... | 1A | 1 | ..... |
| $_1H$ | +1 (K ...) | ..... | 1 | ..... | ..... | ..... | ..... |



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| Elements of the same group | Elements of the same period |
|---|---|
| **Number of energy levels** | |
| • ***They*** are different in the number of energy levels occupied by electrons. | • ***They*** are similar in the number of energy levels occupied by electrons. |
| **Chemical properties** | |
| • ***They*** are similar in their chemical properties, because they are similar in the number of electrons in the outermost energy level. | • ***They*** are different in their chemical properties, because they are different in the number of electrons in the outermost energy level. |
| GR. Magnesium ($_{12}Mg$) and calcium ($_{20}Ca$) are similar in their chemical properties. | GR. Aluminium ($_{13}Al$) and chlorine ($_{17}Cl$) are located in the same period in the periodic table. |
| - Because they are located in the same group (2A) , so they are similar in the number of electrons in the outermost energy level (which are 2 electrons). | - Because they are similar in the number of energy levels occupied by electrons (which are 3 energy levels). |

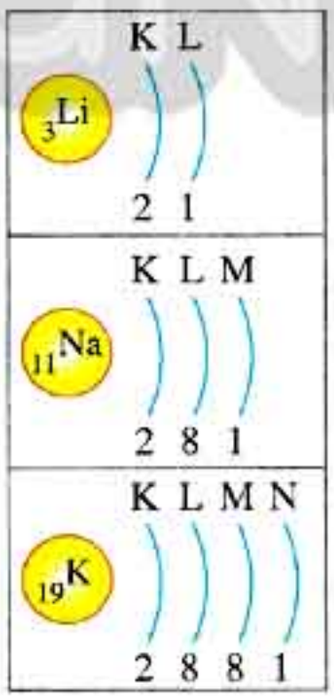
## Exercise 2

***Classify the following elements into two vertical groups, and explain why ?***

[$_2He$ , $_3Li$ , $_{10}Ne$ , $_{11}Na$ , $_{18}Ar$ , $_{19}K$]

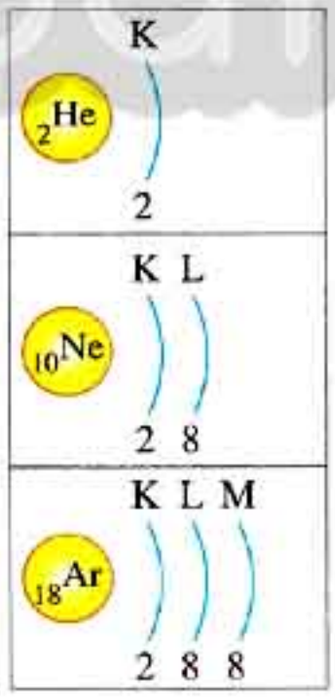
## Answer

- The elements are classified into two groups according to the number of electrons in the outermost energy level in each of them as follows :




Group (1A)
[Group (1)]

- Because the outermost energy level of these elements contains 1 electron.




Zero group
[Group (18)]

- Because the outermost energy level of these elements is saturated with electrons.



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UNIT 1

## How to determine the atomic number of an element of groups (A) by knowing its location in the periodic table :

| | | |
|---|---|---|
| a The period number of the element. | indicates | The number of energy levels occupied by electrons |
| b The traditional group number of the element. | indicates | The number of electrons in the outermost energy level. |
| c The atomic number of the element. | is indicated by | The sum of electrons that revolves around the nucleus. |

## Exercise 3

***Calculate the atomic number of each of the following elements :***

1. Element ($X$) located in the second period and in group (7A).
2. Element (Y) located in the third period and in zero group.

## Answer

**1. Element ($X$).**

∵ It is located in period (2).

∴ Its electrons are distributed in two energy levels.

∵ It is located in group (7A).

∴ The outermost energy level contains 7 electrons.

∴ The atomic number of element ($X$) = 2 + 7 = 9

| K | L |
|---|---|
| 2 | 7 |

**2. Element (Y).**

∵ It is located in period (3).

∴ Its electrons are distributed in three energy levels.

∵ It is located in zero group.

∴ The outermost energy level contains 8 electrons.

∴ The atomic number of element (Y) = 2 + 8 + 8 = 18

| K | L | M |
|---|---|---|
| 2 | 8 | 8 |

## Note

The atomic number of an element is an integer and it increases from an element to the next element in the same period by **one electron**.

Therefore, scientists cannot discover a new element between sulphur ($_{16}S$) and chlorine ($_{17}Cl$) - for example.

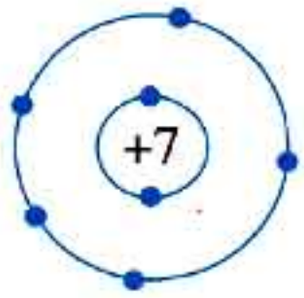


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## Exercise 4

***Study the opposite figure that shows the electronic configuration of element (Z) in the modern periodic table, then deduce the atomic number of :***




**1.** Element (A) which follows it in the same period.

**2.** Element (B) which follows it in the same group.

## Answer

**1.** ∵ The atomic number of element (Z) = 2 + 5 = 7

∴ The atomic number of element (A) that follows it in the same period = 7 + 1 = 8

**2.** ∵ The number of energy levels of element (Z) = 2

∴ The number of energy levels of element (B) that follows it in the same group = 2 + 1 = 3

And the number of electrons in the outermost energy level of both elements (B) and (Z) = 5

∴ The atomic number of element (B) = 2 + 8 + 5 = 15

RaNia Sayed

**TRY** TO ANSWER worksheet 2 in the Notebook



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### ✪ The most important attempts for classifying elements are :

**1. Mendeleev's periodic table.** **2. Moseley's periodic table.** **3. Modern periodic table.**

- In Mendeleev's periodic table, elements are arranged in an ascending order according to their atomic weights.
- In Moseley's periodic table, elements are arranged in an ascending order according to their atomic numbers.
- Scientist Rutherford discovered that the nucleus of the atom contains positively charged protons.
- Bohr had discovered the main energy levels of the atom (7 in the heaviest atoms).
- In the modern periodic table, elements are classified in an ascending order according to :
  - Their atomic numbers.
  - The way of filling the energy sublevels with electrons.
- Number of known elements in the modern periodic table till now is 118, where 92 elements are abundant in Earth's crust, while the rest are prepared artificially.

### ✪ The modern periodic table consists of :

- 7 horizontal periods.
- 18 vertical groups.

- The elements of modern periodic table are classified into 4 blocks (s, p, d, f).
- s-block elements are located on the left side of the periodic table, while p-block elements are located on the right side of the periodic table.
- d- block elements are located in the middle of the periodic table, while f-block elements are located below the periodic table.

### ✪ Determination of the position of the element in the modern periodic table :

- The element period number = number of energy levels occupied with electrons in its atom.
- The element group number = number of electrons in the outermost energy level in its atom.
- Elements of the same group are similar in the number of electrons in the outermost energy level, so they are similar in their chemical properties.
- Elements of the same period are different in the number of outermost electrons, so they differ in their chemical properties.



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# Questions on lesson one



Questions signed by 📖 have been taken from the school book.

## 1. Choose the correct answer :

1. The number of elements in Mendeleev's periodic table is ..... elements.
   a. 92 b. 118 c. 76 d. 67
2. The scientist who left vacancies in his table to be filled with suitable discovered elements in future is .....
   a. Moseley. b. Rutherford. c. Bohr. d. Mendeleev.
3. Mendeleev classified the elements of each group into ..... sub-groups.
   a. 2 b. 3 c. 4 d. 5
4. The nucleus of the atom contains .....
   a. positive electrons. b. negative electrons.
   c. negative protons. d. positive protons.
5. The scientist, who discovered that the nucleus of atom contains positively charged protons is .....
   a. Bohr. b. Mendeleev. c. Rutherford. d. Moseley.
6. 📖 The scientist ..... had discovered the main energy levels.
   a. Moseley b. Bohr c. Hofmann d. Mendeleev
7. The number of energy levels in the heaviest known atom is ..... levels.
   a. 5 b. 7 c. 8 d. 10
8. The number of known elements in the modern periodic table till now is .....
   a. 216 b. 118 c. 316 d. 16
9. The number of elements which exist in nature is .....
   a. 29 b. 118 c. 92 d. 102
10. The modern periodic table consists of ..... horizontal periods.
    a. 7 b. 10 c. 14 d. 18
11. The modern periodic table consists of ..... vertical groups.
    a. 7 b. 10 c. 14 d. 18
12. The elements, which occupy the middle block (d) in the periodic table are called ..... elements.
    a. transition b. alkali c. alkaline earth d. noble
13. The transitional elements start to appear from the beginning of the ..... period.
    a. second b. third c. fourth d. fifth
14. The block which contains the groups (1A) and (2A) in the periodic table is ..... block.
    a. s b. p c. d d. f



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15. Elements of d-block are arranged in ..... groups.
a. 2 b. 5 c. 6 d. 10

16. If the atomic number of an element is 15 , so its group is located in ..... block.
a. d b. s c. f d. p

17. Lanthanides and actinides are located in the ..... block.
a. s b. p c. d d. f

18. Noble gases are located in group .....
a. 7 A b. 8 c. 17 d. 18

19. The atomic number of elements equals .....
a. the number of neutrons inside the nucleus.
b. the number of electrons which rotate in the energy levels around its atom's nucleus.
c. the number of protons inside the nucleus.
d. (b) & (c) are correct.

20. Elements of group (6A) in the periodic table have the same .....
a. number of protons. b. number of energy levels.
c. number of neutrons. d. number of electrons in the outermost level.

21. Elements of the same period in the modern periodic table have the same .....
a. number of protons. b. atomic number.
c. number of energy levels. d. number of electrons in the outermost level.

22. The number of negative electrons in the atom in its normal state equals .....
a. the number of protons. b. the number of neutrons.
c. twice the number of protons. d. half the number of neutrons.

23. In the periodic table, the elements which are similar in their properties locate in the same .....
a. period. b. group. c. nucleus. d. energy level.

24. The element located in period (3) and group (3A) is .....
a. $_{13}Al$ b. $_{5}B$ c. $_{11}Na$ d. $_{15}P$

25. The atomic number of an element located in period (4) and group (2A) is .....
a. 4 b. 18 c. 12 d. 20

26. Which of the following elements are located in the same period with $_{12}Mg$ ? .....
a. $_{7}N$ b. $_{15}P$ c. $_{3}Li$ d. $_{20}Ca$

27. The element whose atomic number (18) is .....
a. transition element. b. inert gas.
c. metallic element. d. halogen element.

28. The atomic number of an element that exists in group (7A) and period (2) is .....
a. 12 b. 7 c. 9 d. 17



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29. The element $_{12}X$ is located in ..... in the periodic table.

a. period (2) and group (2A) b. period (2) and group (3A)

c. period (3) and group (2A) d. period (3) and group (4A)

30. The chemical properties of calcium ($_{20}Ca$) are similar to those of .....

a. $_{19}K$ b. $_{12}Mg$ c. $_{25}Mn$ d. $_{3}Li$

31. The element, whose atomic number is (17) is similar in its chemical construction to the element whose atomic number is .....

a. 2 b. 7 c. 9 d. 19

## 2. Choose from column (B) what suits it in column (A) :

| (A) | (B) |
|---|---|
| 1. Mendeleev | a. added inert gases in (0) group. |
| 2. Rutherford | b. discovered the main energy levels of the atom. |
| 3. Moseley | c. corrected the atomic weights of some elements. |
| 4. Bohr | d. discovered that the nucleus of the atom contains protons. |

## 3. Choose from columns (B) & (C) what suits it in column (A) :

| (A) | (B) | (C) |
|---|---|---|
| 1. d-block elements | a. are located on the left side of periodic table. | A. include lanthanides and actinides. |
| 2. f-block elements | b. are located on the right side of periodic table. | B. take the letter (B) |
| 3. s-block elements | c. are located in the middle of periodic table. | C. consist of 3 columns. |
| 4. p-block elements | d. are located below the periodic table. | D. end by (0) group. |
| | e. are located at the top of the periodic table. | E. are arranged in two groups (1A) & (2A). |

## 4. Put (✓) or (✗) and correct the wrong ones :

1. The chemical elements have been categorized in a table to ease its study. ( )
2. The modern periodic table is the first real table for classifying elements. ( )
3. The elements with similar properties have been put in horizontal periods. ( )
4. The number of recorded elements in Mendeleev's table about 103 elements. ( )



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5. Mendeleev discovered that the properties of elements were repeated periodically by the beginning of each new group. ( )
6. Mendeleev arranged the elements descendingly according to their atomic weights. ( )
7. Mendeleev put more than one element in the same place like nickel and cobalt. ( )
8. Moseley classified elements of each group into two subgroups. ( )
9. The number of known elements till now is 92 elements. ( )
10. Rutherford discovered that the nucleus contains positive charged protons. ( )
11. The modern periodic table is classified into 5 blocks. ( )
12. Bohr had discovered the main energy levels. ( )
13. Inert gases are located in zero group on the left side of the periodic table. ( )
14. Elements of "d" block are arranged in 10 groups. ( )
15. Elements of "p" block are organized in 5 groups. ( )
16. The transitional elements groups are symbolized by (d). ( )
17. Elements of groups (A) are located in the middle of the periodic table. ( )
18. The number of energy levels occupied by electrons in the atom of an element indicates its group number. ( )
19. The element period number equals the number of electrons in the outermost energy level in its atom. ( )
20. The atomic number of every element increases by one over the element that precedes it in the same period. ( )
21. An element locates in period (3) and group (2A), then its atomic number is 13. ( )
22. Sodium ($_{11}$Na) element locates in group (1A) and period (3). ( )
23. Both magnesium ($_{12}$Mg) and aluminium ($_{13}$Al) are located in the same group in the modern periodic table. ( )
24. Both nitrogen ($_{7}$N) and phosphorous ($_{15}$P) are located in the same group in the periodic table. ( )

## 5. Write the scientific term of each of the following :

1. • The first real periodic table for classifying elements.
   • The ascending order of the elements according to their atomic weights (mass).
2. • The partition of the periodic table that contains elements having similar properties in vertical column.
   • The vertical column in Mendeleev's table.
3. • The partition of the periodic table that contains elements having the same number of energy levels.
   • The horizontal row in Mendeleev's table.



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4. The ascending order of the elements according to their atomic numbers.
5. Positively charged particles found inside the nucleus of the atom.
6. The table in which elements are arranged according to the atomic number and the way of filling the energy sublevels with electrons.
7. • They are indicated by the letters K , L , M , N , O , P , Q
   • Their numbers reach 7 in the heaviest known atom.
8. They are indicated by the letters s , p , d , f
9. • A group of elements found in the middle of the periodic table and includes ten groups.
   • A kind of elements symbolized by letter (B).
   • Elements of d-block in the modern periodic table.
   • Elements, which appear starting from period (4) in the modern periodic table.
10. The block, that contains the groups from (3A) to (7A).
11. Elements of zero group in the modern periodic table.
12. The block, that contains the series of lanthanides and actinides.
13. It indicates the number of energy levels, which are occupied with electrons in the atom of an element.
14. It indicates the number of electrons in outermost energy level in the atom of an element.
15. • The sum of the numbers of electrons rotating in energy levels around the nucleus of the atom of an element.
    • The number of protons inside the nucleus of the atom of an element.

## 6. Complete the following statements :

1. The most important attempts to classify elements are ..... , ..... and ..... periodic tables.
2. Mendeleev discovered that the atomic weights of elements increase on moving from ..... side of the table to the ..... side in horizontal rows which were known later as .....
3. Mendeleev organized the elements according to the arrangement of .....
4. One advantage of Mendeleev's table is correcting the wrongly estimated ..... of some elements.
5. The two scientists ..... and ..... made modifications on Mendeleev's table.
6. 🕮 Mendeleev arranged the elements ascendingly according to ..... , while Moseley arranged them ascendingly according to .....
7. Moseley discovered, after studying ..... rays properties, that the periodicity of elements properties is related to their ..... and not to their .....



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8. In Moseley's periodic table, the atomic number of each element increases by ..... than the element before it in the same.....
9. The Newzealand scientist Rutherford discovered that the nucleus of the atom contains ..... of positive charge.
10. Moseley put ..... and ..... series below the periodic table.
11. The Danish scientist ..... had discovered the main energy levels of the atom and their numbers reached ..... in the heaviest atom.
12. Each main energy level contains a definite number of .....
13. In the modern periodic table, elements are arranged according to ..... and .....
14. The number of known elements till now is ..... elements, where ..... elements are found in the earth's crust, while the rest are prepared .....
15. 📖 The modern periodic table consists of ..... horizontal periods and ..... vertical groups.
16. Elements of S-block are located on the ..... side of the periodic table and they are arranged in two groups which are ..... and .....
17. Elements of p-block are located on the ..... side of the periodic table and they are arranged in ..... groups.
18. Groups of d-block take letter ..... except group ....., which consists of ..... vertical columns.
19. The d-block contains ..... elements.
20. The transition elements start from period ..... in the modern periodic table.
21. The modern number of zero group is ..... , while that of group (5A) is .....
22. The vertical groups (1A) and (2A) are located in the ..... side, while the rest of (A) groups are found in the ..... side of the table.
23. The ..... of an element equals the sum of numbers of electrons, which rotate around the nucleus of its atom.
24. The number of energy levels occupied with electrons in the atom of an element indicates its ..... number, while the number of electrons in the outermost energy level in the atom of an element indicates its ..... number.
25. If the atomic number of an element is 7 so, it exists in period ..... and group ..... in the modern periodic table.
26. The atomic number of an element located in group (1A) and period (3) is .....
27. Element ${}_{13}X$ is located in period ..... and group ..... in the modern periodic table.
28. An element whose 2nd energy level contains one electron so, it is located in the ..... period and group ..... in the modern periodic table.



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29. An element, whose electronic configuration is (2 , 8) so, it exists in ..... group and period ..... in the modern periodic table.

30. An element exists in the 3rd period and group (2A) in the modern periodic table so, its atomic number equals .....

## 7. Complete the following tables :

(1)

| Element | Its atomic number | Its electronic configuration | | | Its position in the periodic table | |
|---|---|---|---|---|---|---|
| | | K | L | M | Period No. | Group No. |
| $_{6}C$ | ..... | ..... | ..... | | ..... | ..... |
| $_{8}O$ | ..... | ..... | ..... | | ..... | ..... |
| .... Mg | ..... | ..... | ..... | 2 | ..... | ..... |
| .... Cl | ..... | ..... | ..... | ..... | 3 | (7A) |

(2)

| Element | $_{20}Ca$ | $_{15}P$ | $_{10}Ne$ | $_{1}H$ |
|---|---|---|---|---|
| Electronic configuration : | +20 ) ) ) ) | +15 ) ) ) | +10 ) ) | +1 ) |
| No. of energy levels : | ..... | ..... | ..... | ..... |
| Period number : | ..... | ..... | ..... | ..... |
| No. of electrons in the outermost level : | ..... | ..... | ..... | ..... |
| Group number : | ..... | ..... | ..... | ..... |

## 8. Who ..... ?

1. made the first real periodic table.
2. predicted the discovery of new elements and corrected the atomic weights of some elements.
3. published his book "Principles of Chemistry".
4. classified each main group into two subgroups (A, B).
5. discovered that the nucleus of the atom contains positively charged protons.
6. discovered that the periodic properties of elements are related to their atomic numbers and not their atomic weights.
7. added inert gases to the periodic table.
8. discovered the main energy levels.



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## 9. Give reasons for :

1. Scientists thought about classifying elements according to their properties.
2. Mendeleev left gaps (empty places) in his periodic table.
3. Mendeleev had to make a disturbance in the ascending order of atomic weights of some elements.
4. Mendeleev had to put more than one element in one cell.
5. Mendeleev classified the elements of each group into two subgroups.
6. 📖 Elements of the same group have similar properties.
7. Both sodium ($_{11}Na$) and potassium ($_{19}K$) are located in the same group.
8. Both lithium ($_{3}Li$) and nitrogen ($_{7}N$) are located in the same period.
9. Scientists cannot discover a new element between sulphur ($_{16}S$) and chlorine ($_{17}Cl$).

## 10. Locate the position of the following elements in the modern periodic table :

1. 📖 Hydrogen ($_{1}H$).
2. Nitrogen ($_{7}N$).
3. Carbon ($_{6}C$).
4. 📖 Neon ($_{10}Ne$).
5. Magnesium ($_{12}Mg$).
6. Chlorine ($_{17}Cl$).
7. 📖 Argon ($_{18}Ar$)
8. 📖 Calcium ($_{20}Ca$).
9. Oxygen ($_{8}O$).
10. Potassium ($_{19}K$).
11. Sulphur ($_{16}S$).
12. Boron ($_{5}B$)
13. Phosphorus ($_{15}P$).

## 11. Calculate the atomic numbers of the following elements :

1. An element which is located in the 1st period and group (1A).
2. 📖 An element which is located in the 1st period and group zero.
3. An element which is located in the 3rd period and group (2A).
4. 📖 An element which is located in the 3rd period and group (7A).
5. An element which is located in the 3rd period and group (18).
6. 📖 An element which is located in the 2nd period and group (3A).

## 12. Choose the odd symbol out, then write the scientific term of others :

1. K / F / L / O
2. s / b / d / f
3. $_{3}Li$ / $_{11}Na$ / $_{19}K$ / $_{12}Mg$
4. $_{2}He$ / $_{10}Ne$ / $_{18}Ar$ / $_{12}Mg$
5. $_{3}Li$ / $_{6}C$ / $_{4}Be$ / $_{13}Al$

## 13. Write the number which indicates each of the following :

1. Number of elements in Mendeleev's periodic table.
2. Number of main energy levels in the heaviest atom known till now.



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3. Number of elements in the Modern periodic table till now.
4. Number of elements available in earth's crust.
5. Number of blocks in the modern periodic table.
6. Number of groups in s-block.
7. Number of groups in p-block.
8. Number of groups in d-block.

## 14. Compare between :

1. Mendeleev's periodic table, Moseley's periodic table and the Modern periodic table [according to : the scientific principle of arranging the elements].
2. p-block elements and d-block elements [according to : their location in the modern periodic table - the number of groups forming each of them].
3. s-block elements and p-block elements [according to : their location in the modern periodic table - the number of groups forming each of them].
4. The element $_{11}Na$ and element $_{17}Cl$ in the modern periodic table [according to : the electronic configuration - period no. - group no. - the block symbol].

## 15. Variant questions :

**(1) Write the contributions of the following scientists in chemistry :**

1. Mendeleev. 2. Bohr. 3. Moseley. 4. Rutherford.

**(2) What is the scientific principle upon which the elements are arranged in :**

1. Mendeleev's periodic table. 2. Moseley's periodic table.
3. 📖 Modern periodic table.

**(3) Mention the advantages and disadvantages of Mendeleev's periodic table.**

**(4) The element ($_{17}Y$) is from the elements of the periodic table, find :**

1. Its electronic distribution. 2. Its group number.
3. Its period number.

**(5) You have 3 elements $_{12}X$ , $_{4}Y$ , $_{20}Z$ that are located in the same group.**
**Determine each of the following :**

(a) The number of the group.
(b) In which block are they located ?
(c) The element that lies in the third period. Give a reason for your answer.



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3. In which block each of them is located ?

4. **Choose :** The element Y is located ..... the modern perodic table.

a. on right side of b. on left side of c. below

**(8) A monovalent metallic element is located in the third period in the periodic table, its nucleus contains 12 neutrons.**

1. Calculate :

(a) Its atomic number. (b) Its mass number.

2. Determine :

(a) In which block is it located ? (b) Its group number.

## 16. Study the following figures, then answer the following questions :

**(1) Is the opposite table a part of Mendeleev's periodic table or Moseley's periodic table ?**

**Give a reason.**

| | | | | | | |
|---|---|---|---|---|---|---|
| Li<br>7 | Be<br>9.4 | B<br>11 | C<br>12 | N<br>14 | O<br>16 | F<br>19 |
| Na<br>23 | Mg<br>24 | Al<br>27.4 | Si<br>28 | P<br>31 | S<br>32 | Cl<br>35.5 |

**(2) The following figure shows the electronic configuration of elements of a certain period in the modern periodic table :**




1. What is the number of this period ? Give a reason.
2. What is the number of the group of each of the following elements .....?

(a) Magnesium. (b) Sulphur.

(c) Argon.

3. Does this period contain an element from d-block ? Give a reason.
4. From this period, Determine :

(a) Elements of s-block. (b) Elements of p-block.

**(3) The opposite figure represents one of periods of the modern periodic table :**

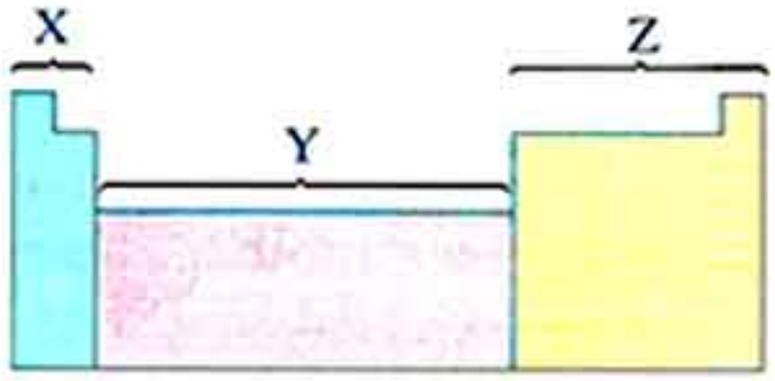
| | | | | | | | |
|---|---|---|---|---|---|---|---|
| A | B | C | $_6$D | E | | Y | Z |

1. What is the number of this period ?
2. What is the number of the group of element (B) ?
3. What is the atomic number of the element which follows the element (A) in the same group ?
4. What is the block of element (C) ?
5. What is the type of element (Z) ? What is the valency of element (Y) ?



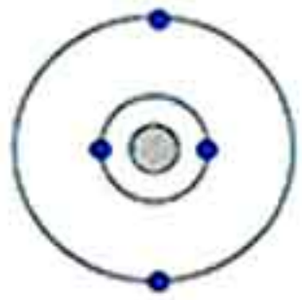
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**(4) Look at the opposite figure, which represents a part of the periodic table, then answer the following :**




1. What are the names of the elements blocks indicated by letters X , Y and Z ?
2. What is the number of groups of each block ?
3. What is the modern (new) number of zero group and group (7A) ?

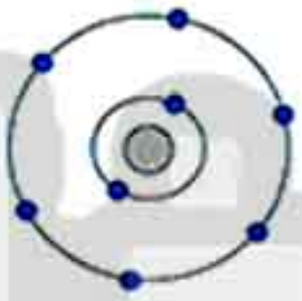
**(5) Study the opposite figure that shows the electronic configuration of an element in the modern periodic table :**



Conclude the atomic number of the element which follows that element in :

1. The same period.
2. The same group.

**(6) Use the represented figure, which indicates the electronic configuration of an element to answer the following :**



1. What is the location of this element in the modern periodic table ?
2. What is the block of this element ?
3. This element is located in the same group with ..... in the modern periodic table.

a. $_{5}B$ b. $_{16}S$ c. $_{19}K$ d. $_{10}Ne$

**(7) The following table represents a part of the modern periodic table, answer the following questions :**

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $_{1}H$ | | | | | | | | | | | | | | | | | $_{2}He$ |
| 3 | X | | | | | | | | | | | 5 | 6 | Y | 8 | 9 | 10 |
| 11 | 12 | | | | | | | | | | | | | | Z | 17 | G |
| 19 | M | | | | N | | | | | | | | | | | 35 | $_{36}Kr$ |

1. Write the letter(s) of the element(s) which is/are :
   (a) among transition elements.
   (b) located in period (3) and group (6A).
   (c) among noble gases.
   (d) considered among s-block.
   (e) considered among p-block.
2. Choose :
   (a) The letter (Y) represents ..... element.
   a. $_{9}F$ b. $_{8}O$ c. $_{12}Mg$ d. $_{7}N$
   (b) The letter (M) represents ..... element.
   a. $_{12}Mg$ b. $_{16}S$ c. $_{20}Ca$ d. $_{18}Ar$



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(b) The letter (M) represents ..... element.

a. $_{12}Mg$ b. $_{16}S$ c. $_{20}Ca$ d. $_{18}Ar$

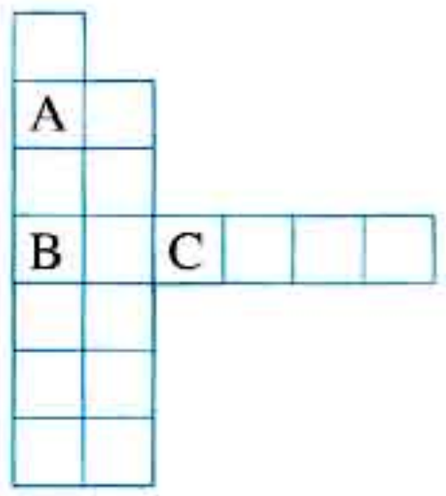
(c) The element (N) locates in ..... block.

a. s b. p c. d d. f

3. What is the atomic number of the elements N and G ?

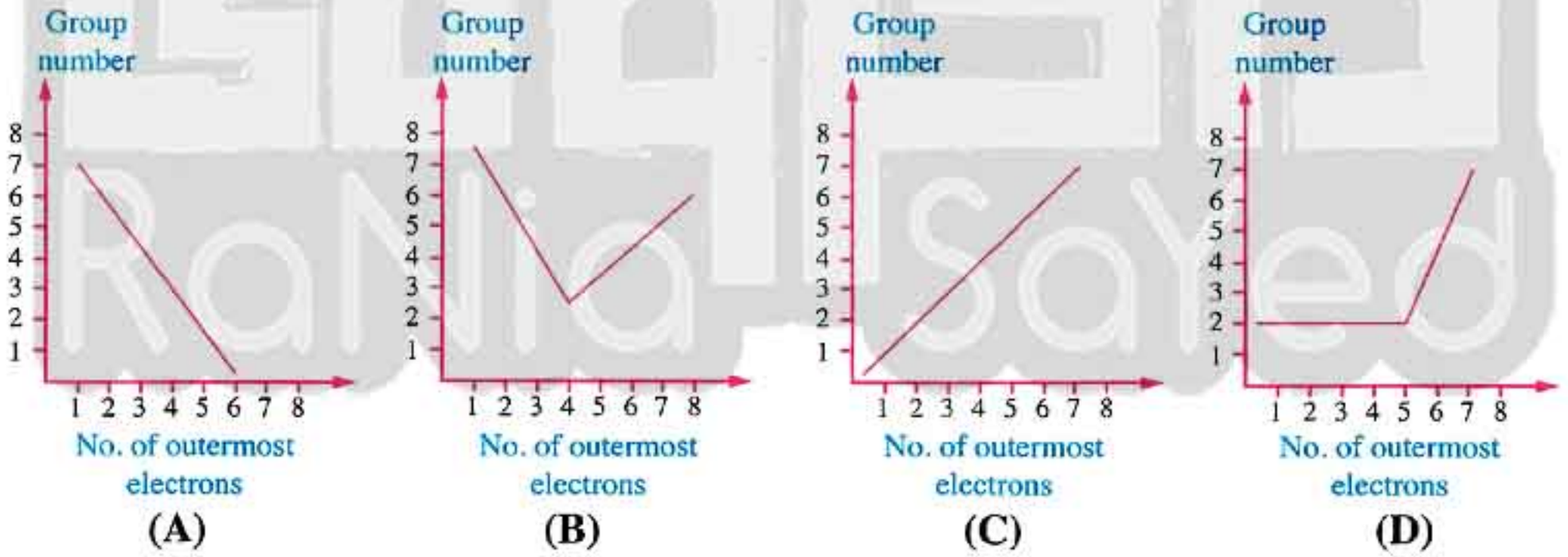
**(8) The figure shows a section of the modern periodic table.**

**Answer the following questions.**




1. Mention two elements :
   (a) In the same period.
   (b) In the same group.
   (c) In two different periods.
2. What is the atomic number of the element "B" ?
3. What is the block of the element "C" ?

**17. Which of the following graphs represents the relation between the number of electrons in the outermost energy level and the group number, through the 3rd period in the modern periodic table and why ?**






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## 1. Complete :

1. Elements whose atomic numbers from 1 : 18 occupy ..... periods in the modern periodic table.
2. X and Y are two successive elements located in one period, if the atomic number of Y is 15 , so the atomic number of X may be ..... or .....
3. A and B are two successive elements in one group, if the atomic number of A = 3, so the atomic number of B may be ..... or .....

## 2. Choose the correct answer :

1. Number of elements located in the third period of the modern periodic table is .....

a. 2 b. 8 c. 18 d. 32

2. $^{31}_{15}P$ , $^{32}_{16}S$ are two elements similar in the : .....

a. Period number and number of neutrons.
b. Group number and number of protons.
c. Group number and number of neutrons.
d. Period number and number of protons.

3. The properties of the element, which has atomic number equals 17 similar to the element which has atomic number equals .....

a. 7 b. 9 c. 15 d. 20

4. An element located in the third period and group number 13, the number of neutrons in its nucleus equals 14 , so its mass number equals .....

a. 30 b. 27 c. 24 d. 20

## 3. Give a reason for :

The modern periodic table consists of 7 horizontal periods.

## 4. Mention the atomic number of :

a. Metallic element (X) is divalent and located in the third period.
b. Inert gas located in the third period.



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LESSON 2

# Graduation of the Properties of Elements in the Modern Periodic Table




## How

does the electronic configuration of elements affects its properties ?

***There is a graduation of the elements properties in the modern periodic table and there is a relation between these properties and the electronic configuration of elements.***

## For Examples :

**The graduation of some properties of the elements in groups (A) and periods.**

**Such as :**

1. Atomic size.
2. Electronegativity.
3. Metallic and non-metallic properties.

### 1 Atomic size :

- The atomic size is determined by knowing the atomic radius of the atom and its measuring unit is **picometre (Pm)**.
- **Picometre = part of million of the million part of a metre.**

[**i.e** picometre = $1 \times 10^{-12}$ m]

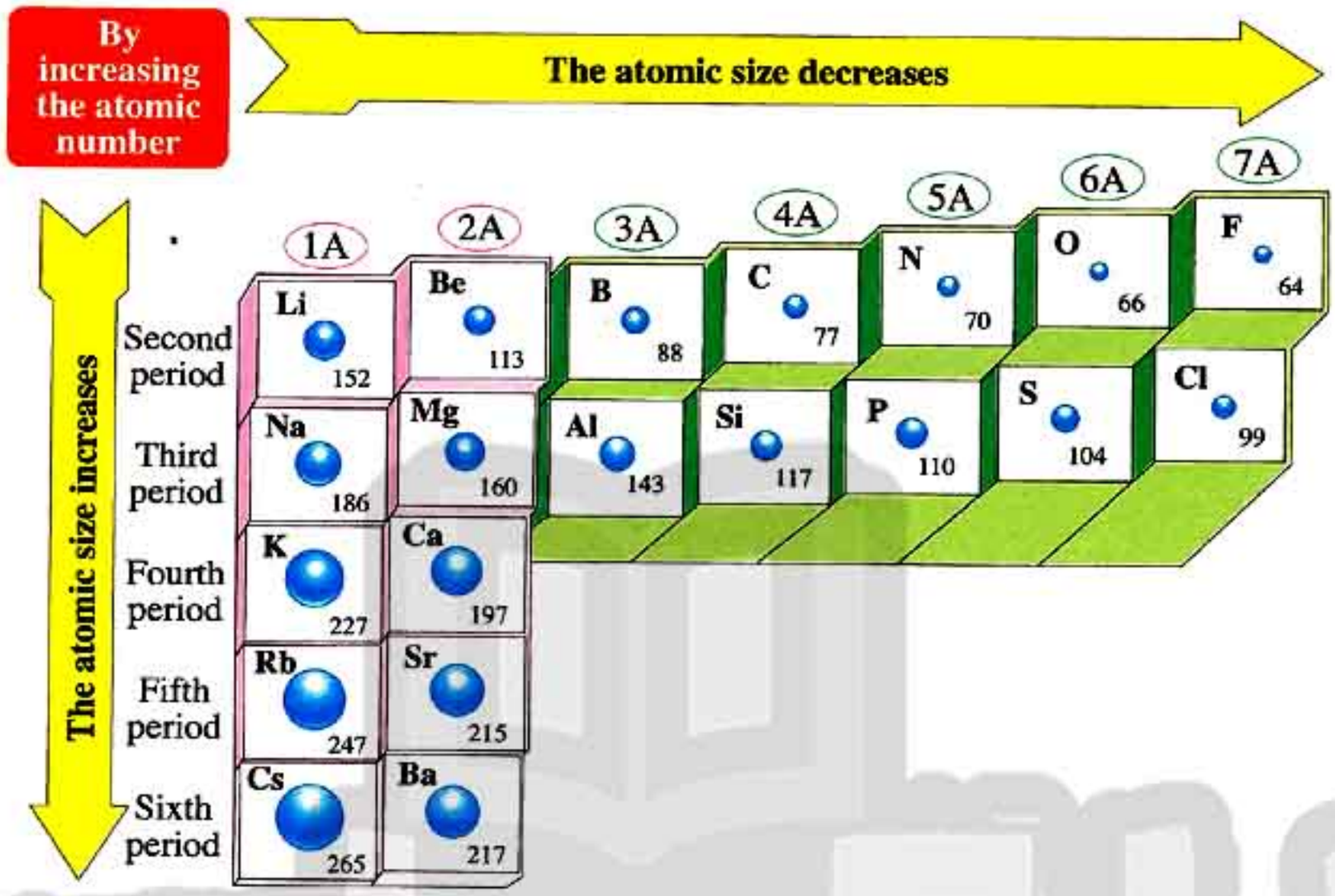


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Lesson Two

## Graduation of atomic size of elements in the periodic table :

Look at this part of the periodic table which represents the atomic size of some elements.




### We find that :

**Atomic size in periods :**

The atomic size decreases from left to right in the same period GR.

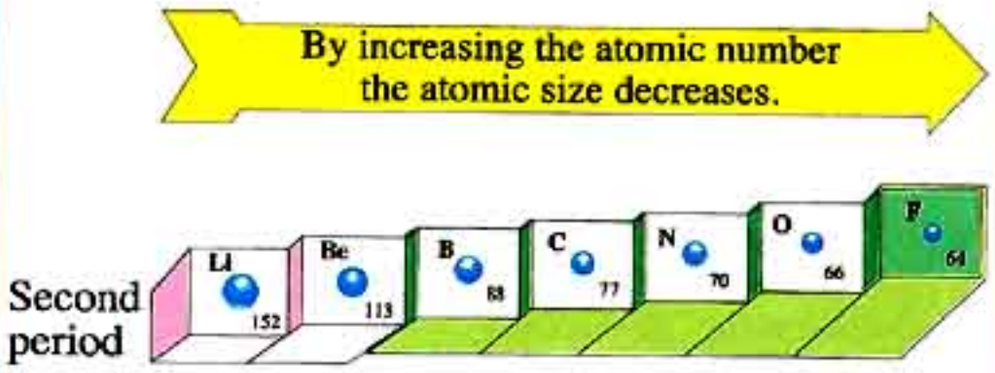
**Because by increasing the atomic number in the same period, the attraction force between the positive nucleus and the outermost electrons increases.**

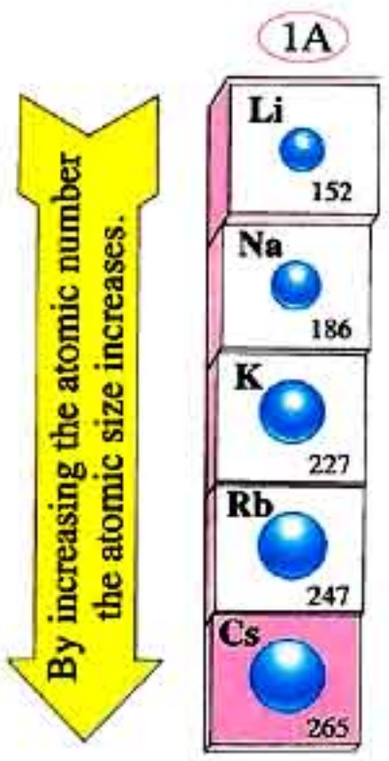
**Atomic size in groups :**

The atomic size increases from up to down in the same group GR.

**Because by increasing the atomic number in the same group, the number of energy levels occupied by electrons increases.**

**Examples**



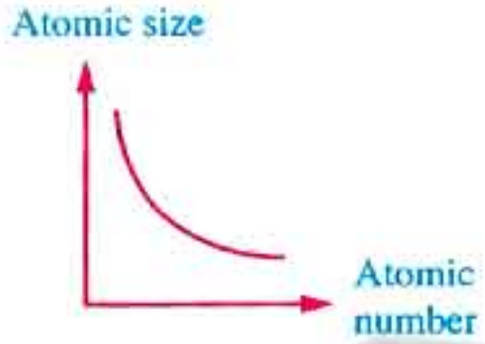



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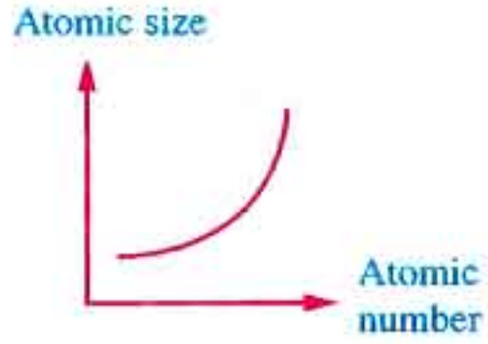
**From the previous explanation we conclude that :**

*The atomic size of the elements of the same period is inversely proportional to the atomic number.*




The relation between the atomic size and the atomic number of the elements of the second period

*The atomic size of the elements of the same group is directly proportional to the atomic number.*




The relation between the atomic size and the atomic number of the elements of group (1 A)

**Note**

**Fluorine (F)**

- Is the smallest atomic size element in the modern periodic table, where it is located at the top right of the periodic table.

**Notes**

**Cesium (Cs)**

- Is the largest atomic size element in the modern periodic table, where it is located at the bottom left of the periodic table.
- The elements of group (1A) are the largest atomic size elements in the modern periodic table.

## Application

The atomic size of lithium ($_3$Li) is greater than that of beryllium ($_4$Be) and smaller than that of sodium ($_{11}$Na). **Can you explain why ?**

*Because by increasing the atomic number in the same group, the number of energy levels occupied with electrons increases, so the atomic size of lithium ($_3$Li) is smaller than that of sodium ($_{11}$Na).*

| | |
|---|---|
| $_3$Li | $_4$Be |
| $_{11}$Na | |

*Because by increasing the atomic number in the same period, the attraction force between the positive nucleus and the outermost electrons increases, so the atomic size of lithium ($_3$Li) is greater than that of beryllium ($_4$Be).*

## 2 Electronegativity :

* You have known from the previous studies that the atoms of elements combine together by chemical bonds forming elements molecules or compounds molecules.
* The ability of atoms of elements differs to attract the electrons of the bond which is known as the electronegativity.



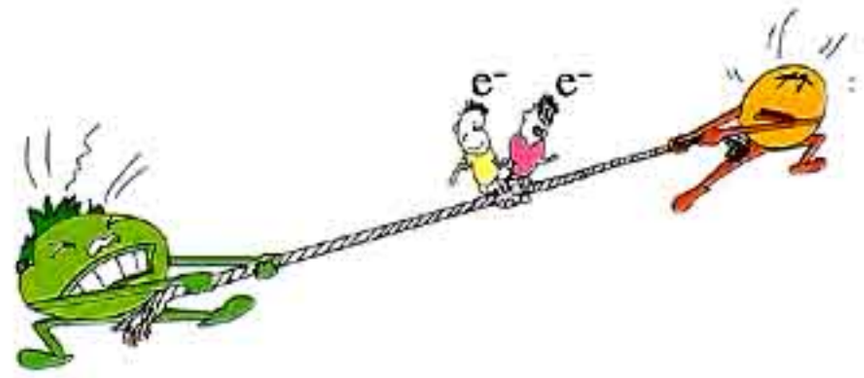
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Lesson Two

* Each element has its own value of electronegativity.

## Electronegativity:

It is the ability of the atom in covalent molecule to attract the electrons of the chemical bond towards itself.




GR. ***The inert gases haven't electronegativity.***

Because they don't combine with other elements under the normal conditions.

### The difference in electronegativity :

The difference in electronegativity between combined elements determines the kind of the formed compound if it is:

- **A polar compounds**
- **A non-polar compounds**
- **An ionic compounds**

* **Now,** we will study :

**The polar compounds only.**

### Enrichment information

*If the difference in electronegativity between elements of a covalent compound molecule equals zero, the bond in this molecule is called Pure covalent bond. As in diatomic gases like oxygen molecule ($O_2$), hydrogen molecule ($H_2$), .....*

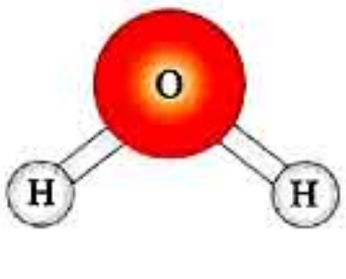
## Polar compound :

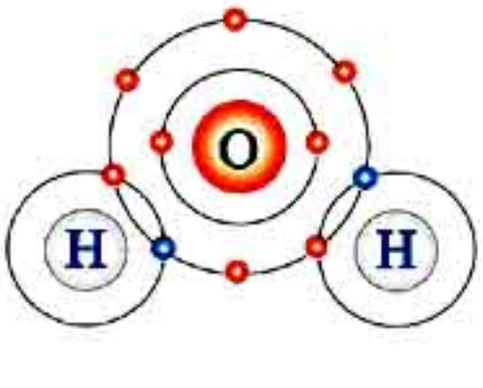
It is a covalent compound, in which the difference in electronegativity between its elements is relatively high.

## Examples :

### 1 Water molecule ($H_2O$) :

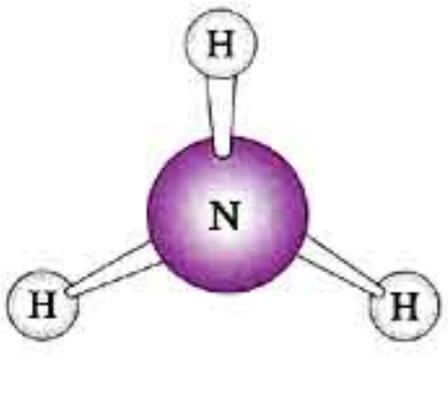
- It consists of combination of one oxygen atom with two hydrogen atoms.

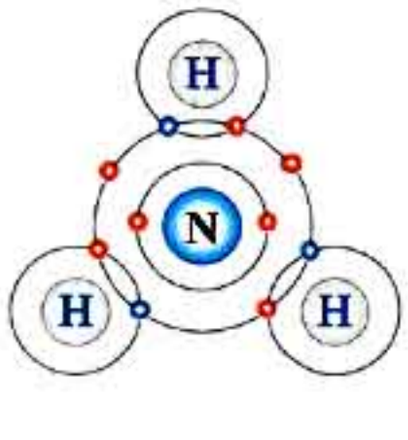



### 2 Ammonia molecule ($NH_3$) :

- It consists of combination of one nitrogen atom with three hydrogen atoms.






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UNIT 1

GR. • ***Water and ammonia are from polar covalent compounds.***
Because the difference in electronegativity between the elements of each of them is relatively high.

• ***The polarity of water is more than that of ammonia.***
Because the difference in electronegativity between oxygen and hydrogen in water molecule **is greater than** the difference between nitrogen and hydrogen in ammonia molecule.

**For illustration**

| Compound | The difference in electronegativity between its elements |
|---|---|
| Water ($H_2O$) | Oxygen Hydrogen<br>3.5 – 2.1 = 1.4 |
| Ammonia ($NH_3$) | Nitrogen Hydrogen<br>3 – 2.1 = 0.9 |

TRY TO ANSWER worksheet in the Notebook 3

## 3 Metallic and non-metallic property :

**Elements in the periodic table are classified into four main kinds :**

1 Metals | 2 Nonmetals | 3 Metalloids (semi-metals) | 4 Noble gases

### 1 Metals :

**Metals:**
They are the elements, which have less than four electrons in their outermost energy levels (valancy electrons).

**For illustration**
*Berzelius was the first scientist who classified the elements into metals and nonmetals.*

**➲ During the chemical reactions :**

- The atoms of metallic elements tend to lose their outermost electrons and change into ***positive ions*** to reach the electronic configuration of the **nearest preceding inert gas** in the periodic table.

**Positive ion:**
It is an atom of a metallic element which lost one electron or more during the chemical reaction.

- The positive ions carry a number of positive charges equal to the number of the **lost electrons**.



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## Examples :

| Metal | Electronic configuration K | L | M | Positive ion | Electronic configuration K | L | The nearest preceding inert gas |
|---|---|---|---|---|---|---|---|
| Sodium ($_{11}$Na) | 2 | 8 | (1) | $Na^{+}$ | 2 | 8 | Neon |
| Magnesium ($_{12}$Mg) | 2 | 8 | (2) | $Mg^{+2}$ | 2 | 8 | $_{10}$Ne |
| Aluminium ($_{13}$Al) | 2 | 8 | (3) | $Al^{+3}$ | 2 | 8 | (2 , 8) |

**NB**

The electronic configuration of **($Na^{+}$) , ($Mg^{+2}$)** and **($Al^{+3}$)** ions is similar to the electronic configuration of neon ($_{10}$Ne) atom.

## 2 Nonmetals :

### Nonmetals:

They are the elements, which have more than four electrons in their outermost energy levels.

### ➲ During the chemical reactions :

- The atoms of nonmetallic elements tend to gain electrons, and change into ***negative ions*** to reach the electronic configuration of the **nearest following inert gas** in the periodic table.

### Negative ion:

It is an atom of nonmetallic element which gained one electron or more during the chemical reaction.

- The negative ions carry a number of negative charges equal to the number of the **gained electrons**.

## Examples :

| Nonmetal | Electronic configuration K | L | M | Negative ion | Electronic configuration K | L | M | The nearest following inert gas |
|---|---|---|---|---|---|---|---|---|
| Phosphorous ($_{15}$P) | 2 | 8 | (5) | $P^{-3}$ | 2 | 8 | 8 | Argon |
| Sulphur ($_{16}$S) | 2 | 8 | (6) | $S^{-2}$ | 2 | 8 | 8 | $_{18}$Ar |
| Chlorine ($_{17}$Cl) | 2 | 8 | (7) | $Cl^{-}$ | 2 | 8 | 8 | (2 , 8 , 8) |

**NB**

The electronic configuration of **($P^{-3}$) , ($S^{-2}$)** and **($Cl^{-}$)** ions is similar to the electronic configuration of argon ($_{18}$Ar) atom.



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UNIT 1

## Comparison between the positve ion and the negative ion :

| The positive ion (cation) | The negative ion (anion) |
|---|---|
| - It is an atom of a **metallic** element that **loses** one electron or more during the chemical reactions. | - It is an atom of a **nonmetallic** element that **gains** one electron or more during the chemical reactions. |
| - It carries positive charges equal to the number of the **lost electrons**. | - It carries negative charges equal to the number of the **gained electrons**. |
| - The number of its protons is more than that of its electrons. | - The number of its electrons is more than that of its protons. |
| - Its electronic configuration is similar to that of the **nearest preceding inert gas**. | - Its electronic configuration is similar to that of the **nearest following inert gas**. |
| • The number of its energy levels is **less than** the number of energy levels in its atom. | • The number of its energy levels is **equal to** the number of energy levels in its atom. |

**Examples**




## 3 Metalloids (semi-metallic elements) :

**Metalloids:**

They are the elements, which have the properties of both metals and nonmetals.

**Examples :** Boron, silicon, germanium, arsenic, antimony and tellurium

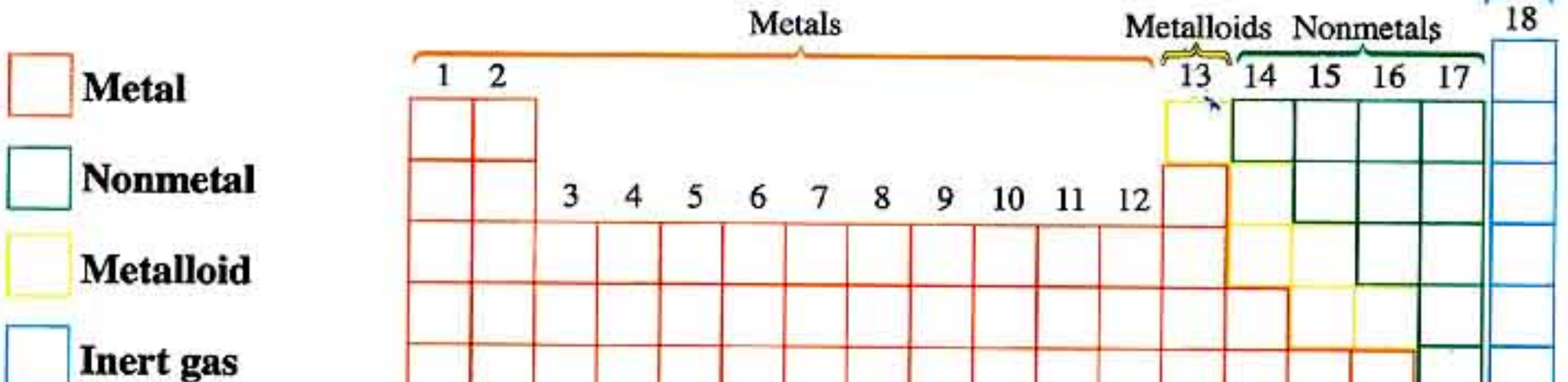
**For illustration**

- It is difficult to know the metalloids from their outermost electrons due to the difference in numbers of the electrons in their valencies shells as shown in the following table :

| $_5B$ | $_{14}Si$ | $_{33}As$ | $_{52}Te$ |
|---|---|---|---|
| 3 | 4 | 5 | 6 |

## Graduation of metallic and nonmetallic property in the modern periodic table :

* We conclude from the following figure which represents a part of the modern periodic table that :






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Lesson Two

### ➲ In periods :

Each period starts with **strong metal** [in group 1 (1A)], where by increasing the atomic number :

- The **metallic** property decreases till we reach **metalloids**.
- Then the **nonmetallic** property appears and increases till we reach the **strongest nonmetal** [in group 17 (7A)].

## Application

The graduation of metallic and nonmetallic property within period "3"

By increasing the atomic number, the metallic property decreases and, nonmetallic property increases

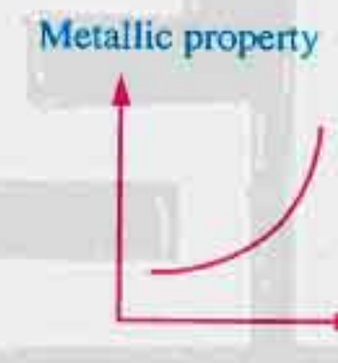
| Period 3 | $_{11}$Na Sodium | $_{12}$Mg Magnesium | $_{13}$Al Aluminium | $_{14}$Si Silicon | $_{15}$P Phosphorous | $_{16}$S Sulphur | $_{17}$Cl Chlorine |
|---|---|---|---|---|---|---|---|
| **Electronic configuration** | 2,8,1 | 2,8,2 | 2,8,3 | 2,8,4 | 2,8,5 | 2,8,6 | 2,8,7 |
| **Kind of element** | Strong metal | Metal | Metal | Metalloid | Non-metal | Non-metal | strong non-metal |

### ➲ In groups :

**In metallic groups (groups which start with metal) :**

The metallic property increases gradually as we go from top to bottom as in group (1A)

GR. **because as the atomic number increases the atomic size increases, so the ability to lose the outermost electron increases.**




The relation between the metallic property and the atomic number of the elements of group (1A)

## Application

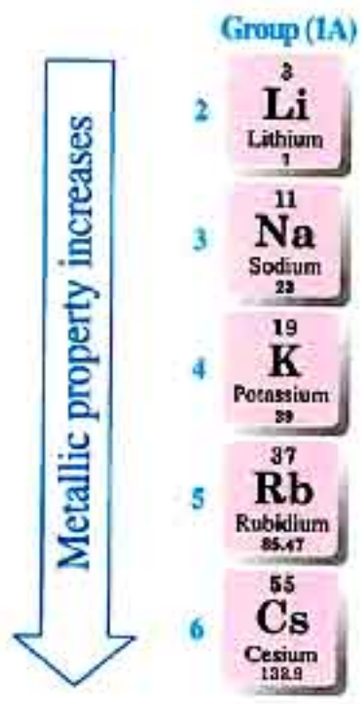
**The graduation of metallic property within group (1A).**

- The elements of this group are arranged ascendingly according to the graduation of metallic property as follows :

Li < Na < K < Rb < Cs

**Therefore :**

- ***Lithium (Li)*** is the *lowest* metallic element in group (1A).
- ***Cesium (Cs)*** is the *strongest* metallic element in group (1A).




GR. ***Cesium is considered as one of the strongest metallic elements.***
Because cesium has the largest atomic size, so it can lose its valency electrons easily.



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UNIT 1

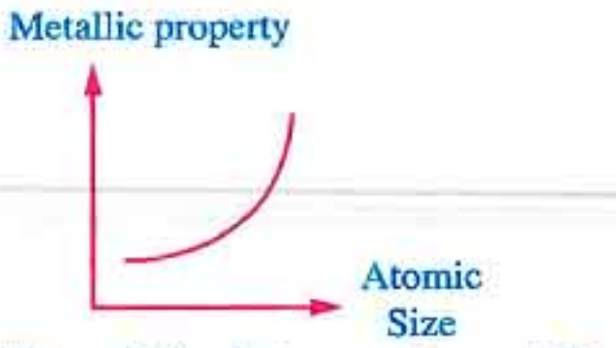
## Exercise 1

***Mention with drawing, the type of the relation between atomic size and metallic property.***

### Answer

There is a direct relationship between the atomic size of an element and its metallic property.

**i.e** : *By increasing the atomic size, the metallic property increases.*




The relation between the metallic property and the atomic size.

**Note**

**In nonmetallic groups (groups which start with nonmetal) :**

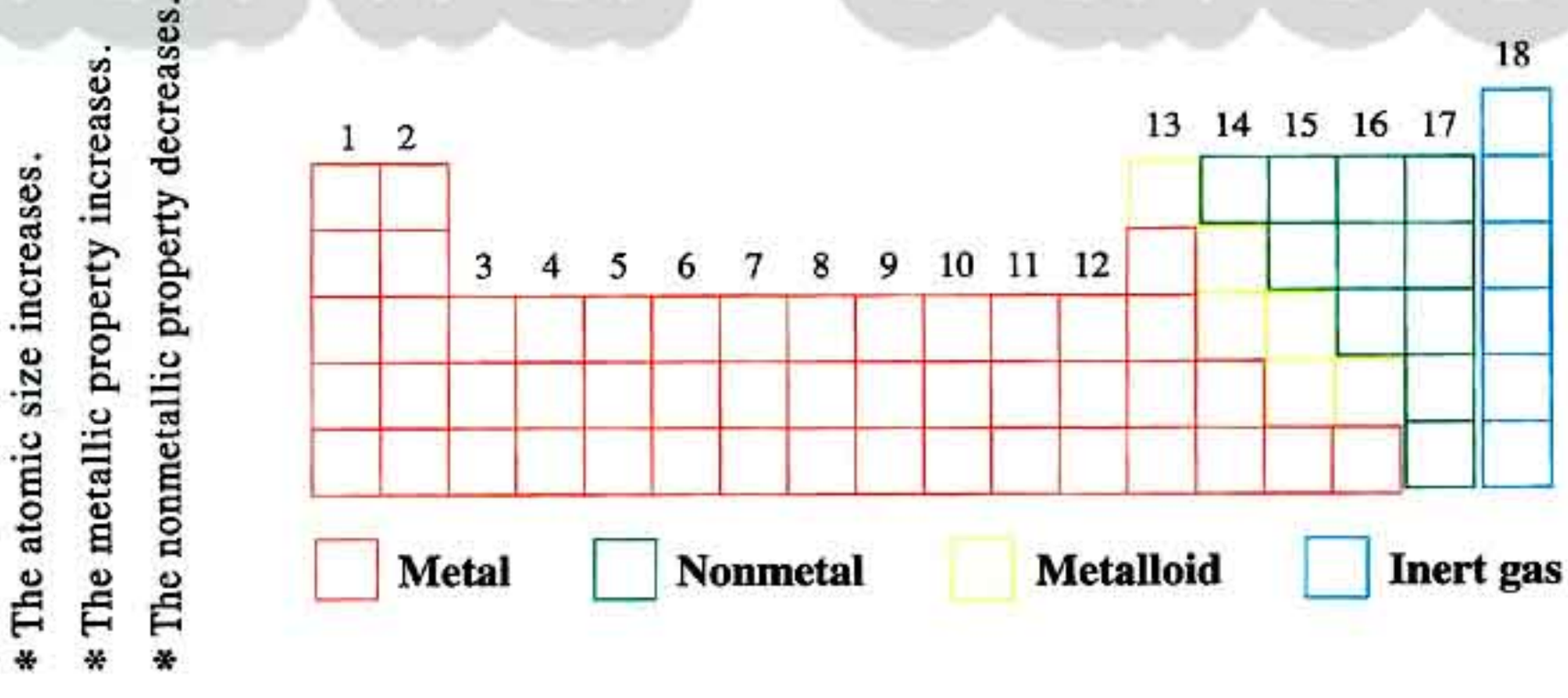
The nonmetallic property decreases gradually as we go from top to bottom as in group (7A) GR. **due to the decrease in electronegativity values.**

TRY TO ANSWER worksheet in the Notebook 4

**➲ The following figure shows the graduation of properties of elements in the modern periodic table :**

By increasing the atomic number

* The atomic size decreases.
* The metallic property decreases.
* The nonmetallic property increases.






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## Application

The following figure represents a part of the periodic table.

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | He |
| Li | | | | | | | | | | | | | | O | F | Ne | |
| Na | | | | | | | | | | | Al | | | S | Cl | Ar | |
| K | | | | | | | | | | | | | | | | | |

**Determine the symbol which indicates the following :**

1. The largest atomic size element of the third period. (.....)
2. An element, whose electronic configuration is similar to the electronic configuration of the ion of K element. (.....)
3. Nonmetal, whose ion electronic configuration is similar to the electronic configuration of Ar element. (.....)
4. An element, whose ion electronic configuration is similar to the electronic configuration of He element. (.....)
5. Metal, whose ion electronic configuration is similar to the electronic configuration of Ne element. (.....)

**Answer :**

(1) Na (2) Ar (3) Cl (4) Li (5) Na

# Chemical properties of metals :

➲ **To know the chemical properties of metals, do the following activities :**

## 1 Reaction of metals with dilute acids :

### Activity 1

**Substances and used tools :**

- A test tube.
- A magnesium strip.
- Dilute hydrochloric acid.

| ⊙ Step | ⊙ Illustrating figure | ⊙ Observation |
|---|---|---|
| Put a part of magnesium strip in a test tube and add some dilute hydrochloric acid (HCl). |   | A gas evolves with bubbles. |



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UNIT 1

### Conclusion :

Some active metals such as magnesium (Mg) and zinc (Zn) react with dilute acids (as hydrochloric acid) giving ***a salt of an acid*** and ***hydrogen gas*** which burns with a pop sound with a lighted match.

$$\underset{\text{Magnesium}}{Mg} + \underset{\text{Hydrochloric acid}}{2HCl} \xrightarrow{\text{Dilute}} \underset{\text{Magnesium chloride}}{MgCl_2} + \underset{\text{Hydrogen gas}}{H_2\uparrow}$$

## 2 Reaction of metals with oxygen :

### Activity 2

#### Substances and used tools :

- A magnesium strip.
- A jar filled with oxygen.
- Water.
- Litmus solution.

| ⊙ Steps | ⊙ Illustrating figures | ⊙ Observations |
|---|---|---|
| 1. Ignite one end of a magnesium strip until it burns then put it inside a jar filled with oxygen gas. |   | - Magnesium strip burns with a bright light and a substance (magnesium oxide) is formed. |
| 2. Add some water to the produced substance (magnesium oxide), then add drops of violet litmus solution. |   | - Magnesium oxide dissolves in water.<br>- The litmus solution turns into blue. |



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## Conclusion :

- Some metals such as magnesium (Mg) react with oxygen giving ***metal oxides,*** which are called ***"Basic oxides"***

**Basic oxides:**

They are metallic oxides, some of them dissolve in water forming alkaline solutions.

$$2Mg + O_2 \xrightarrow{\Delta} 2MgO$$

Magnesium + Oxygen → Magnesium oxide

- Some metal (basic) oxides (such as magnesium oxide) dissolve in water giving ***alkalis*** (metal hydroxide) which turns litmus solution into ***blue***.

**▸ Enrichment information**

*A mixture of $MgO$, $MgCl_2$ and $H_2O$ is used in making stones for making blades of knives which are very thin (sharpening knives)*

$$MgO + H_2O \longrightarrow Mg(OH)_2$$

Magnesium oxide + Water → Magnesium hydroxide

## Note

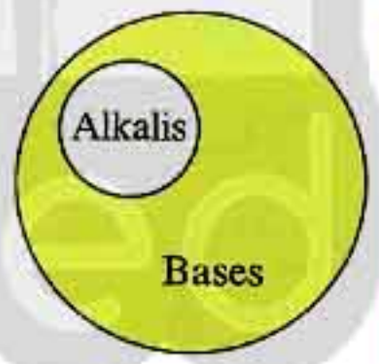
- All alkalis are bases, while not all bases are alkalis : GR.

All alkalis are bases :

Because alkalis formed when bases dissolve in water.

While, not all bases are alkalis :

Because not all bases dissolve in water.




## Exercise 2

***By using Mg, how can you change the colour of litmus solution into blue?***

## Answer

1. Burning of Mg strip inside a jar filled with oxygen gas :
   $2Mg + O_2 \xrightarrow{\Delta} 2MgO$ (Magnesium oxide) (basic oxide)
2. Adding some water to the produced substance :
   $MgO + H_2O \longrightarrow Mg(OH)_2$ (Magnesium hydroxide)
3. Adding drops of violet litmus solution, it will changed into blue.



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UNIT 1

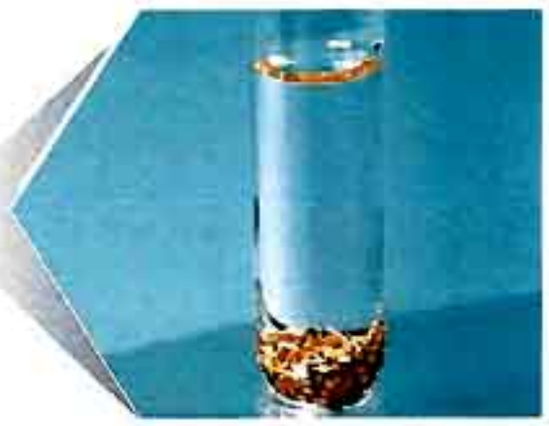
## 3 Reaction of metals with water :

The reaction of metals with water depends on the position of the metal in **"Chemical activity series"** :

### Chemical Activity Series:

It is a series in which metals are arranged in a descending order according to their chemical activity.

➲ **The following table shows the reaction of metals with water :**

| Metals | Reaction with water | |
|---|---|---|
| K Potassium<br>Na Sodium | They **react instantly** with water and hydrogen gas evolves which burns with a pop sound. |  |
| Ca Calcium<br>Mg Magnesium | They **react very slowly** with cold water. |  |
| Zn Zinc<br>Fe Iron | They **react with hot water vapour** at high temperatures only. |  |
| Cu Copper<br>Ag Silver | They **don't react** with water. |  |

**▸ Enrichment information**

*The rise in sodium ion concentration $Na^+$ in the body causes a rise in blood pressure, so high blood pressure patients are advised to reduce table salt in their food.*



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## Life application Cleaning of silver tools :

- Cover the bottom of a plastic plate with an aluminium paper (foil), whereas the bright surface is upward.
- Put the silver tools which you want to clean on the aluminium paper.
- Cover them with enough boiling water and then put (3) spoons of baking powder.
- Leave the tools for 15 minutes with stirring.
- Dry the tools after rinsing them with hot water , then polish them with a piece of wool to become brighter.



Bright silver plate

## Chemical properties of nonmetals :

➲ **To know the chemical properties of nonmetals, do the following activities :**

### 1 Reaction of nonmetals with dilute acids :

### Activity 3

**Substances and used tools :**

- A piece of coal (carbon).
- A test tube.
- Dilute hydrochloric acid (HCl).

| ⊙ Step | ⊙ Illustrating figure | ⊙ Observation |
|---|---|---|
| Put a piece of coal (carbon) in a test tube then add some dilute HCl to it. |   | - No reaction takes place. |

**Conclusion :**

Nonmetals (such as carbon) don't react with dilute acids (such as HCl).



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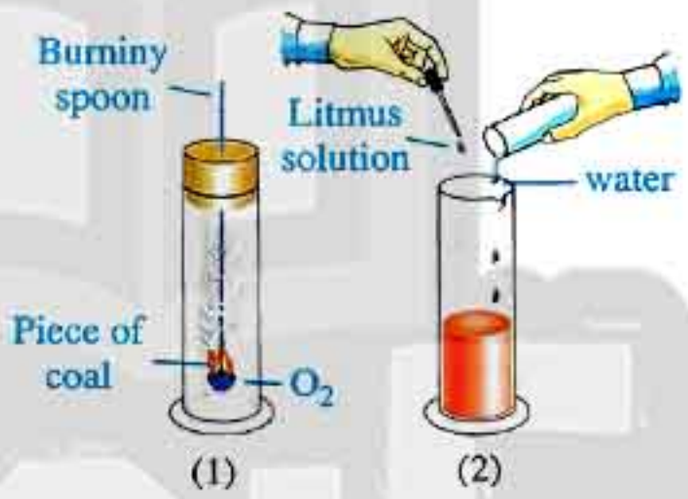
UNIT 1

## 2 Reaction of nonmetals with oxygen :

### Activity 4

**Substances and used tools :**

- A piece of coal (carbon).
- A cylinder full of oxygen.
- A burning spoon.
- Water.
- Litmus solution.

| ⊙ Steps | ⊙ Illustrating figure | ⊙ Observations |
|---|---|---|
| 1. Burn a piece of coal in a burning spoon and put it after complete burning in a cylinder full of oxygen.<br>2. Add some water to the cylinder with shaking and drops of violet litmus solution. |  | - The glow increases.<br>- The produced substance from burning (carbon dioxide) dissolves in water and the solution turns into red. |

**Conclusion :**

- Nonmetals such as carbon (C) react with oxygen giving ***nonmetal oxides,*** which are known as ***"Acidic oxides"***.

**Acidic oxides:**

They are nonmetallic oxides, which dissolve in water forming acidic solutions.

$$\underset{\text{Carbon}}{C} + \underset{\text{Oxygen}}{O_2} \xrightarrow{\Delta} \underset{\text{Carbon dioxide}}{CO_2}$$

- Nonmetal (acidic) oxides (such as carbon dioxide) dissolve in water forming ***acids,*** which turn litmus solution into ***red***.

$$\underset{\text{Carbon dioxide}}{CO_2} + \underset{\text{Water}}{H_2O} \longrightarrow \underset{\text{Carbonic acid}}{H_2CO_3}$$

**Note**

- *Some metal oxides as aluminium oxide ($Al_2O_3$) are known as "Amphoteric oxides" because they can react with acids as a base and also react with a base as an acid giving salt and water.*



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## Example :

How can you differentiate between calcium oxide solution and sulpher trioxide solution.




### Answer :

By using litmus solution, the calcium oxide solution turns into blue and the sulpher trioxide solution turns into red.

## ➲ Comparison between metals and nonmetals :

| Metals | Nonmetals |
|---|---|
| - They are the elements, which have less than four electrons in their outermost energy levels. | - They are the elements, which have more than four electrons in their outermost energy levels. |
| - They tend to lose electrons and change into (+ ve) ions. | - They tend to gain electrons and change into (– ve) ions. |
| - They are characterized by largest atomic sizes. | - They are characterized by smallest atomic sizes. |
| - Some of them react with dilute acids forming a salt of an acid and hydrogen gas. | - They don't react with dilute acids. |
| - They react with oxygen forming basic oxides. | - They react with oxygen forming acidic oxides. |

## ➲ Comparison between basic oxides and acidic oxides :

| Basic oxides | Acidic oxides |
|---|---|
| - They are metal oxides. | - They are nonmetal oxides. |
| - They are formed by the reaction of metal with oxygen. | - They are formed by the reaction of nonmetal with oxygen. |
| - Some of them dissolve in water giving alkalis. | - They dissolve in water giving acids. |
| - Their solutions turn litmus solution into blue. | - Their solutions turn litmus solution into red. |
| - **Ex.:** $Na_2O$ & MgO | - **Ex.:** $CO_2$ & $SO_2$ |

TRY TO ANSWER worksheet in the Notebook 5 & 6



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- There is a graduation of the elements properties in the modern periodic table and there is a relation between these properties and the electronic configuration of elements.

- **Atomic size :**
  - Atomic size is determined by knowing the atomic radius.
  - In periods, by increasing the atomic number, the atomic size decreases.
  - In groups, by increasing the atomic number, the atomic size increases.

- **Electronegativity :**

  It is the ability of the atom in a covalent molecule to attract the electrons of the chemical bond towards itself.

- Difference in electronegativity between elements forming compound molecules determines the kind of bond between elements if it is a covalent bond or not.

- **Polar compounds :**

  They are covalent compounds in which the difference in electronegativity between their elements is relatively high as water molecule ($H_2O$), and ammonia molecule ($NH_3$).

- **Metals :**

  They are the elements, which have less than four electrons in their outermost energy levels.

- **Nonmetals :**

  They are the elements, which have more than four electrons in their outermost energy levels.

- **Metalloids :**

  They are the elements, which have the properties of both metals and nonmetals.

- **Basic oxides :**

  They are metallic oxides, some of them dissolve in water forming alkaline solutions.

- **Chemical Activity Series :**

  It is a series, in which metals are arranged in a descending order according to their chemical activity.

- **Acidic oxides :**

  They are nonmetallic oxides, which dissolve in water forming acidic solution.



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# Questions on lesson two



Questions signed by 📖 have been taken from the school book.

## 1. Choose the correct answer :

1. The atomic radius is used as a measurement of the atomic size of the atom and its measuring unit is .....
   a. metre. b. millimetre. c. nanometre. d. picometre.
2. In period (2), the atomic size of oxygen ($_8O$) is greater than that of .....
   a. $_6C$ b. $_9F$ c. $_3Li$ d. $_5B$
3. In periods, by increasing the atomic number, the .....
   a. atomic size decreases. b. atomic size increases.
   c. atomic radius increases. d. no correct answer.
4. Which of the following elements is a metallic element ? .....
   a. $_{12}Mg$ b. $_{17}Cl$ c. $_8O$ d. $_{10}Ne$
5. During the chemical reactions, metal atoms tend to .....
   a. lose electrons and change into negative ions.
   b. gain electrons and change into negative ions.
   c. lose electrons and change into positive ions.
   d. gain electrons and change into positive ions.
6. An element ($X$), whose atomic number is 13 so, the number of electrons in its ion is .....
   a. 8 b. 10 c. 11 d. 12
7. The electronic configuration of sodium ion ($Na^+$) is similar to that of .....
   a. $_7N$ b. $_{18}Ar$ c. $_{10}Ne$ d. $_8O$
8. The electronic configuration of magnesium ion ($Mg^{+2}$) is similar to all the following except .....
   a. $Na^+$ b. $_{10}Ne$ c. $Al^{+3}$ d. $_{18}Ar$
9. If you know that the atomic number of an element = 11, which of the following figures represents the electronic configuration of its ion ? .....




10. The electronic configuration of the ions of all the following elements is similar to that of $_{18}Ar$ except .....
    a. $_{15}P$ b. $_{16}S$ c. $_9F$ d. $_{17}Cl$
11. The difference between chlorine ($_{17}Cl$) atom and chloride ion ($Cl^-$) is the number of .....
    a. energy levels. b. protons. c. neutrons. d. electrons.



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UNIT 1

12. ..... are examples of metalliod elements.
a. Sodium and sulpher b. Boron and arsenic
c. Boron and sodium d. Chlorine and argon

13. 📖 Each period in the periodic table starts with .....
a. metal. b. metalloid. c. nonmetal. d. inert gas.

14. By increasing the atomic number within the period, the .....
a. metallic property decreases. b. nonmetallic property increases.
c. atomic size decreases. d. all the previous answers.

15. By increasing the atomic number within group (1A), the .....
a. atomic size decreases. b. nonmetallic property increases.
c. metallic property increases. d. all the previous answers.

16. ..... is the lowest metallic element in group (1A).
a. Na b. Cs c. K d. Li

17. 📖 Metal oxides (as sodium oxide) are ..... oxides.
a. acidic b. basic
c. amphoteric d. no correct answer

18. Magnesium reacts with oxygen giving .....
a. $Mg(OH)_2$ b. $MgCl_2$ c. MgO d. $MgSO_4$

19. All of the following metals react with water except .....
a. K b. Cu c. Na d. Mg

20. 📖 When sodium reacts with water, ..... gas evolves.
a. $N_2$ b. $O_2$ c. $H_2$ d. $CO_2$

21. Which of the following elements reacts with dilute hydrochloric acid ? .....
a. C b. Cu c. S d. Zn

22. Which of the following is an acidic oxide .....
a. MgO b. $CO_2$ c. FeO d. CuO

23. The oxides of the 3rd period elements are as the following .....
a. acidic, amphoteric, then basic. b. acidic , basic , then amphoteric.
c. basic , acidic , then amphoteric. d. basic , amphoteric , then acidic.

24. Burning of carbon in air produces .....
a. CO b. $CO_2$ c. $H_2CO_3$ d. CuO

25. The oxide which dissolves in water and produces an acid is .....
a. MgO b. FeO c. CuO d. $CO_2$

## 2. Put (✓) or (×) and correct the wrong ones :

1. 📖 The atomic size increases in the same group by increasing the atomic number. ( )
2. In the group, the atomic size increases as we go from top to bottom. ( )
3. The atomic size of chlorine ($_{17}Cl$) is greater than that of magnesium ($_{12}Mg$). ( )
4. The atomic size decreases in periods as the atomic number increases. ( )



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5. The covalent bond becomes polar when the difference in electronegativity between the bonded atoms = zero. ( )
6. 📖 Water and ammonia are from polar compounds. ( )
7. Water molecule is a polar compound because the difference in electronegativity between its elements is low. ( )
8. The electronic structure of the positive ion is similar to that of the nearest following inert gas. ( )
9. Both an oxygen ion ($O^{-2}$) and an argon atom (Ar) have the same electronic configuration. ( )
10. During the chemical reaction, ($_{12}Mg$) atom tends to form positive ion that carries one positive charge. ( )
11. Each period starts with a weak metal. ( )
12. Metalloids have the properties of metals and nonmetals. ( )
13. 📖 By increasing the atomic number within a period, the metallic property increases. ( )
14. The metallic property in group (1A) increases as we go from up to down. ( )
15. Magnesium reacts with dilute HCl and $Cl_2$ gas evolves. ( )
16. Magnesium oxide is a basic oxide. ( )
17. Metals are arranged in an ascending order according to their chemical activity in the chemical activity series. ( )
18. Sulphuric acid is produced when carbon dioxide gas dissolves in water. ( )
19. Iron is more active than silver and less active than calcium. ( )
20. Copper and zinc don't react with water. ( )
21. Some metal oxides dissolve in water giving acids. ( )
22. Burning a piece of coal gives CO gas which is an acidic oxide. ( )
23. 📖 Solutions of nonmetal oxides turn the violet litmus solution into red. ( )
24. 📖 Some alkalis dissolve in water forming bases. ( )

## 3. Write the scientific term of each of the following :

1. • A part of million of the million part of a metre.
   • The measuring unit of atomic radius which is used as a measure for the atomic size.
2. The ability of the atom in a covalent molecule to attract the electrons of the chemical bond towards itself.
3. Covalent compounds, in which the difference in electronegativity between their elements is relatively high.
4. The polar compound, which consists of one oxygen atom and two hydrogen atoms.
5. • A kind of elements in which their valency shell contain less than 4 electrons.
   • Elements whose atoms tend to lose electrons during chemical reactions and change into positive ions.



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UNIT 1

6. An atom which lost or gained one electron or more during the chemical reaction.
7. An atom of metallic element, which loses one electron or more during the chemical reaction.
8. • A kind of elements, in which their valency shell contain more than 4 electrons.
   • Elements whose atoms tend to gain electrons during chemical reactions and change into negative ions.
9. An atom of a nonmetallic element, which gains one electron or more during the chemical reaction.
10. The inert gas, which has the same electronic structure of sodium ion ($Na^+$).
11. Elements, which have the properties of metals and nonmetals.
12. A group contains the strongest nonmetals.
13. A solution used to differentiate between acids and bases.
14. Oxides, which dissolve in water producing alkalis.
15. • Substances, which turn the litmus solution into blue.
    • Substances resulted from dissolving of metal oxides in water.
16. A kind of metal oxides reacts with acids as a base and also reacts with a base as an acid.
17. • A series, in which metals are arranged in a descending order according to their chemical activity.
    • A descending arrangement of elements according to their chemical activity.
18. • Substances which turn the litmus solution into red.
    • Substances resulted from dissolving of nonmetal oxides in water.
19. The nonmetal oxides which dissolve in water giving acids.

## 4. Complete the following statements :

1. ..... is used as a measure for atomic size of an atom and its measuring unit is .....
2. By increasing the atomic number, the values of atomic sizes ..... in the periods of the periodic table.
3. By increasing the atomic number in groups, the atomic size ..... due to the increase of the number of .....
4. The atomic size of lithium ($_3Li$) atom is ..... than that of nitrogen ($_7N$) atom and ..... than that of sodium ($_{11}Na$) atom.
5. The element ($_8X$) has ..... atomic size than element ($_6Y$).
6. ..... is the ability of the atom in covalent molecule to attract the ..... of the chemical bond towards itself.
7. ..... and ..... are examples of polar compounds.
8. The polarity of water is ..... than that of ammonia as the difference in ..... between elements of water is ..... than that between elements of ammonia.
9. Elements are classified into four main kinds which are metals, nonmetals, ..... and .....



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10. The outermost level of metallic elements contains ..... than four electrons, while that of nonmetallic elements contains ..... than four electrons.
11. During the chemical reaction, nonmetal atom tends to ..... electrons and changes into .....
12. During the chemical reaction, magnesium ($_{12}Mg$) atom loses ..... electrons and changes into ..... ion, which carries ..... positive charges.
13. The ..... ion carries a number of ..... equals the number of lost electrons.
14. The number of ..... charges of the negative ion is equal to the number of gained .....
15. ..... have the properties of both metals and nonmetals.
16. By increasing the atomic number within a period, the metallic property ....., while the nonmetallic property .....
17. Each period in the modern periodic table starts with ..... and ends with .....
18. The most metallic element in group (1A) is ..... .
19. By increasing the atomic number within group (1A), the metallic property .....,
20. Some metals react with dilute acids giving ..... and ..... gas evolves.
21. Some basic oxides dissolve in water giving ....., which turn the litmus solution into .....
22. Metals are arranged in a ..... order according to their ..... in chemical activity series.
23. ..... metal reacts with hot water vapour, while ..... metal doesn't react with water.
24. ..... is an example of nonmetals which doesn't react with dilute acids.
25. Metal oxides are called ..... oxides, while nonmetal oxides are called ..... oxides.
26. Nonmetal oxides dissolve in water giving ..... which turn the litmus solution into .....

## 5. Complete the following chemical equations :

1. $2\,Mg + O_2 \xrightarrow{\Delta}$ .....
2. ..... + ..... $\longrightarrow Mg(OH)_2$
3. $Mg + 2HCl \xrightarrow{dil.}$ ..... + .....
4. $C + O_2 \xrightarrow{\Delta}$ .....
5. ..... + ..... $\longrightarrow H_2CO_3$

## 6. Complete the following table :

| Element | Its electronic configuration | Its kind | Formula of its oxide | Type of its oxide |
|---|---|---|---|---|
| 1. $_{11}Na$ | ..... | metal | $Na_2O$ | ..... |
| 2. $_{12}Mg$ | ..... | ..... | ..... | ..... |
| 3. $_{6}C$ | ..... | nonmetal | ..... | ..... |



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UNIT 1

## 7. Give a reason for each of the following :

1. • The atomic size decreases in periods by increasing the atomic number.
   • The atomic size of ($_3$Li) is greater than that of ($_4$Be).
2. • The atomic size increases by increasing the atomic number within groups.
   • The atomic size of ($_{11}$Na) is greater than that of ($_3$Li)
3. Water molecule is from the polar molecules.
4. Water is more polar than ammonia.
5. Ammonia ($NH_3$) is considered as a polar covalent compound.
6. During the chemical reactions, sodium ($_{11}$Na) atom tends to form a positive ion.
7. During the chemical reaction, chlorine ($_{17}$Cl) atom tends to form a negative ion.
8. Both sodium ion ($Na^+$) and fluoride ion ($F^-$) have the same electronic configuration.
9. The metallic property increases gradually in the metallic groups from top to bottom.
10. Cesium (Cs) is considered as one of the strongest metallic elements.
11. Nonmetallic property decreases gradually as we go from top to bottom in group (7A).
12. Solution of magnesium oxide in water turns the violet litmus solution into blue.
13. Potassium reacts instantly with water, while copper doesn't react with water.
14. Solution of carbon dioxide in water turns the violet litmus solution into red.
15. Barium oxide is considered as a basic oxide.
16. Aluminium oxide is considered as an amphoteric oxide.

## 8. What is meant by .... ?

1. Electronegativity.
2. Polar compounds.
3. Metals.
4. Nonmetals.
5. Positive ion.
6. Negative ion.
7. 📖 Metalloids.
8. 📖 Chemical Activity Series.
9. Basic oxides.
10. Acidic oxides.

## 9. Write the balanced chemical equations, which express the following reactions :

1. Burning a magnesium strip in oxygen.
2. 📖 Magnesium with dilute hydrochloric acid.
3. Burning a piece of coal in air.
4. 📖 Carbon dioxide with water.
5. Dissolving of magnesium oxide in water.

## 10. Arrange the following elements

1. $_{11}$Na / $_{19}$K / $_{13}$Al / $_{12}$Mg (ascendingly according to atomic size)
2. $_{19}$K / $_3$Li / $_{55}$Cs / $_{11}$Na (ascendingly according to the metallic property)
3. Cu / Zn / Mg / K (ascendingly according to the chemical activity)



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## 11. How can you differentiate chemically between each of the following ? [Write the chemical equation if it is possible]

1. Magnesium oxide (metal oxide) and carbon dioxide (nonmetal oxide).
2. Sodium and iron [using $H_2O$].

## 12. Choose the odd word out, then write the scientific term of others :

1. $Al^{+3}$ / $Na^{+}$ / $Mg^{+2}$ / $Cl^{-}$ / $O^{-2}$
2. Silver / Sodium / Iron / Calcium.
3. $CO_2$ / MgO / $Na_2O$ / CaO

## 13. What happens when ... ?

1. Increasing the atomic number in group (1A) [concerning the atomic size].
2. A metallic atom loses one electron or more during the chemical reaction.
3. A nonmetallic atom gains one electron or more during the chemical reaction.
4. We go from up to down inside group (1A).
5. Adding dilute HCl to a piece of magnesium.
6. Burning a magnesium strip inside a test tube contains oxygen.
7. Dissolving magnesium oxide in water.
8. Adding the violet litmus solution to magnesium hydroxide.
9. Adding the violet litmus solution to a jar containing a piece of burning coal.

## 14. Compare between each of the following :

1. The period and group.
2. Positive ion and negative ion.
3. Basic oxides and acidic oxides.
4. Metals and nonmetals.

## 15. 🕮 Explain the behaviour of the following elements with water :

1. Iron. 2. Silver. 3. Potassium.

## 16. Write short notes on each of the following :

1. The graduation of atomic size within a period.
2. The graduation of atomic size within a group.
3. The graduation of metallic property within period (3).
4. The graduation of metallic property within group (1A).
5. The graduation of nonmetallic property within group (7A).

## 17. Prove by an experiment that :

1. Magnesium oxide is a basic oxide.
2. Carbon dioxide is an acidic oxide.



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UNIT 1

## 18. Variant questions :

(1) $2Mg + O_2 \xrightarrow{\Delta}$ (A) (A) + $H_2O \longrightarrow$ (B)

1. Write the name and the chemical formula of (A) and (B).
2. Mention the effect of (B) on litmus solution.

**(2) Three elements $_{11}X$ , $_{6}Y$ , $_{12}Z$ ; which of these elements :**

1. reacts instantly with water and hydrogen gas evolves which burns with a pop sound ?
2. reacts very slowly with cold water ?
3. whose oxide consists of two atoms only ?

**(3) Three elements $_{3}X$ , $_{9}Y$ and $_{11}Z$ ,which element :**

1. has the smallest atomic size.
2. is the strongest metallic property.

**(4) Sodium ($_{11}Na$), aluminium ($_{13}Al$) and carbon ($_{6}C$) are three elements from the periodic table, mention :**

(A) The period that these elements belong to.

(B) The number of group of each element.

(C) The type of oxide of each element.

(D) The type of solution which is formed as a result of adding water to :

1. Sodium oxide. 2. Carbon dioxide.

**(5) If you have the following materials [Water ($H_2O$) - Zinc (Zn) - Hydrochloric acid (HCl) - Magnesium oxide (MgO)]. By chemical equations only, show how can you get an alkaline solution and a metal chloride ?**

**(6) How can you clean the silver tools by a chemical way ?**

## 19. Study the following figures, then answer the questions :

**(1) Look at the following figures, then answer :**

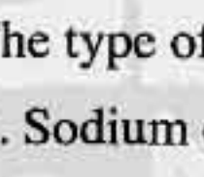


Fig. (A)

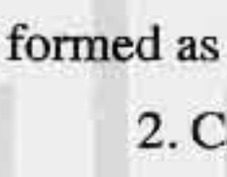


Fig. (B)

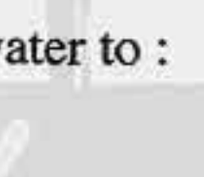


Fig. (C)

Which one of the figures represents ... ?

1. A neutral atom. 2. A positive ion. 3. A negative ion.



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**(2) From the opposite figure, which represents a part of periodic table. Answer the following :**

1. Which element has the greatest atomic size ?
2. Which element has the lowest atomic size ?
3. If the electronegativity of (H) equals 2.1 and that of (N) is 3, calculate the polarity in Ammonia ($NH_3$).

| | | | | | |
|---|---|---|---|---|---|
| $_3Li$ | $_4Be$ | $_5B$ | $_6C$ | $_7N$ | $_8O$ |
| $_{11}Na$ | | | | | |
| $_{19}K$ | | | | | |

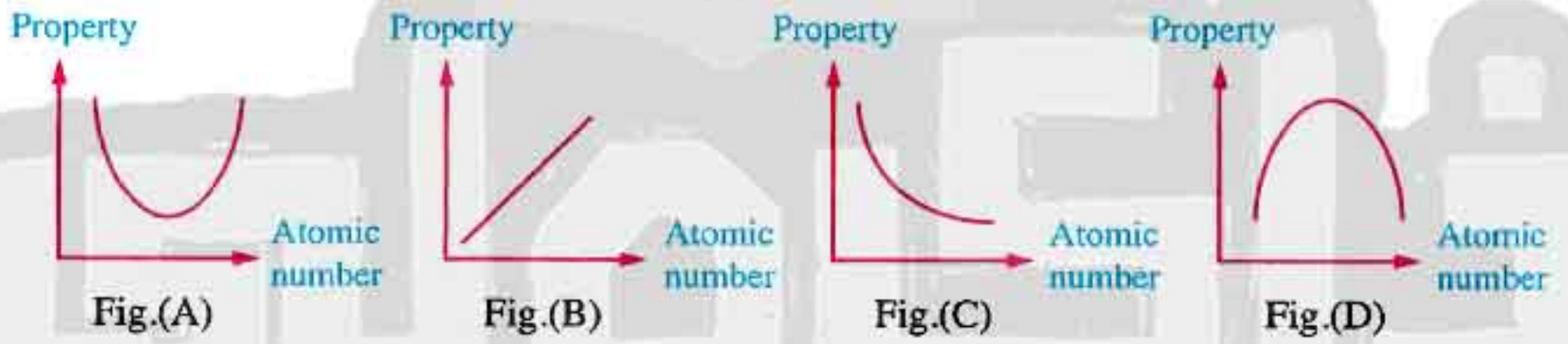
**(3) On adding a dilute hydrochloric acid to a magnesium ribbon (as shown in the figure), a gas is evolved :**

1. Name the gas, how can you identify it?
2. Write the symbolic balanced equation which expresses this reaction.




**(4) Which of the following figures represents :**

The graduation of the atomic size property in period (3).




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## 1. Choose the correct answer :

1. In the opposite figure, ..... represents the ascending arrangement for the elements (X , Y , Z) according to the atomic size.

| | | | |
|---|---|---|---|
| | | | |
| | | | |
| X | Y | | |
| Z | | | |
| | | | |

a. $Z > Y > X$ b. $Z > X > Y$

c. $Y < X < Z$ d. $X > Y > Z$

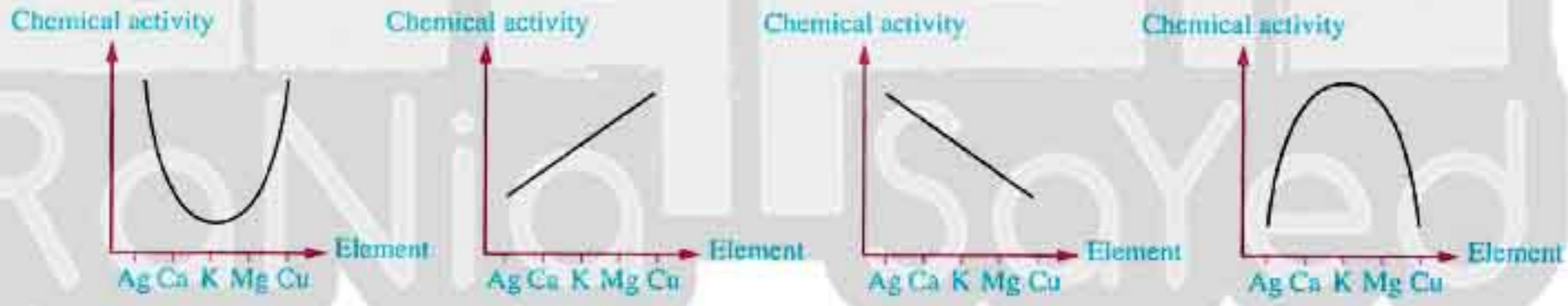
2. The number of electrons present in the ion of trivalent metallic element, whose electrons orbit in three energy levels is .....

a. 3 b. 8 c. 10 d. 13

3. The nucleus of $X^{-2}$ ion is surrounded by 18 electrons revolve around it, and the mass number of this ion equals 32, so the number of electrons in the X atom is ..... and the number of its neutrons is .....

a. 16 , 23 b. 18 , 23 c. 18 , 32 d. 16 , 16

4. Graph number ..... represents the degree of the chemical activity of some elements with water.

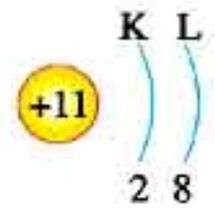



a. b. c. d.

## 2. Arrange the following elements in a descending order according to their atomic size.

( $_{14}Si$ / $_{19}K$ / $_{12}Mg$ / $_{9}F$ / $_{20}Ca$ / $_{8}O$)

## 3. The opposite figure represents the electronic configuration of an ion of an element, mention :




a. The atomic number of the atom of this element, which block does it belong to ?

b. The location of this element in the modern periodic table.

c. The nearest inert gas for this element.

d. The type of oxide of this element.



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**4.** **Nonmetallic element (X), whose electrons orbit in 2 energy levels, when it reacts with oxygen, it forms ($XO_2$) oxide.**

a. Calculate the atomic number of this element.

b. What is the type of this oxide ? **(Give a reason)**.

**5.** **Metallic element (X) located in the third period of the modern periodic table, When it combines with oxygen, it forms (XO) oxide. Answer the following questions :**

a. Mention the valency of this element and its atomic number.

b. Mention the type of its oxide and the block which the element belongs to.

c. What happens when we add few drops of litmus solution to this oxide ?

**6.** **Divalent nonmetallic element located in the second period whose nucleus contains 8 neutrons, calculate :**

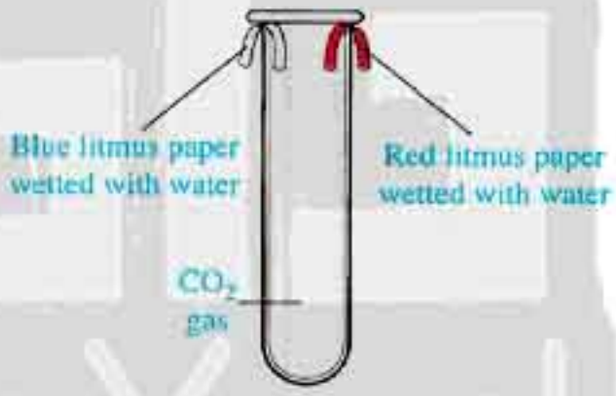
a. Its mass number.

b. Number of electrons located in the outermost energy level of its ion.

**7.** **In the opposite figure :**

a. What happens in this case ? **(Give a reason)**.

b. Write the chemical equation of the reaction.




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LESSON 3

# Main Groups in the Modern Periodic Table



## What

are the properties of alkali metals and halogens elements ?

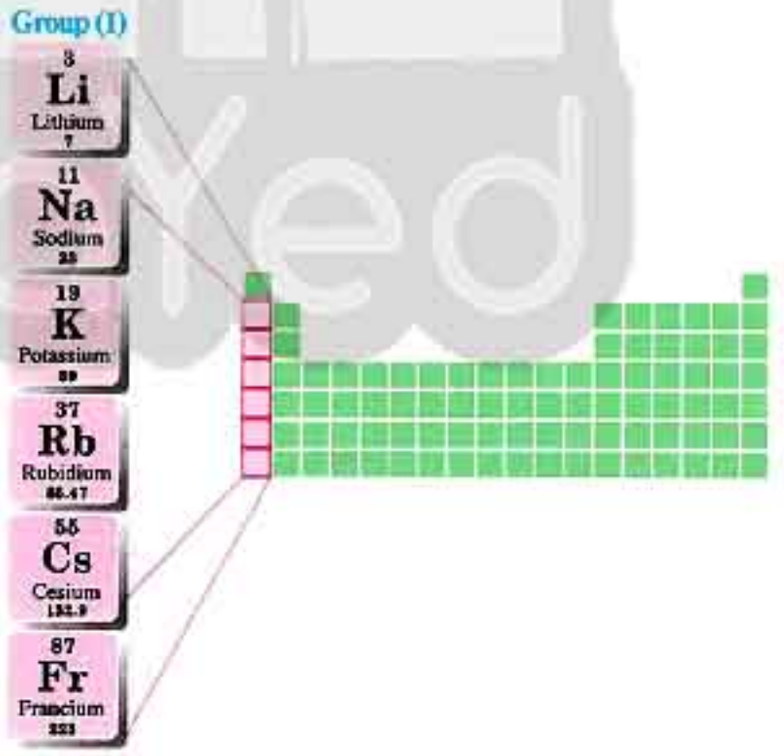
- ***In this lesson, we will study two groups of the main groups in the periodic table which are :***

1. **Group (1) or (1A) which is called "Alkali metals" group.**
2. **Group (17) or (7A) which is called "Halogens" group.**
3. **Group (18) or (Zero group) which is called "Inert gases" group.**

## 1 Alkali metals [group (1A)] :

### ➲ Location in the modern periodic table :

- They are located on the left side of the modern periodic table (as shown in the opposite figure).
- They are the first group of s-block.




### ➲ General properties of alkali metals :

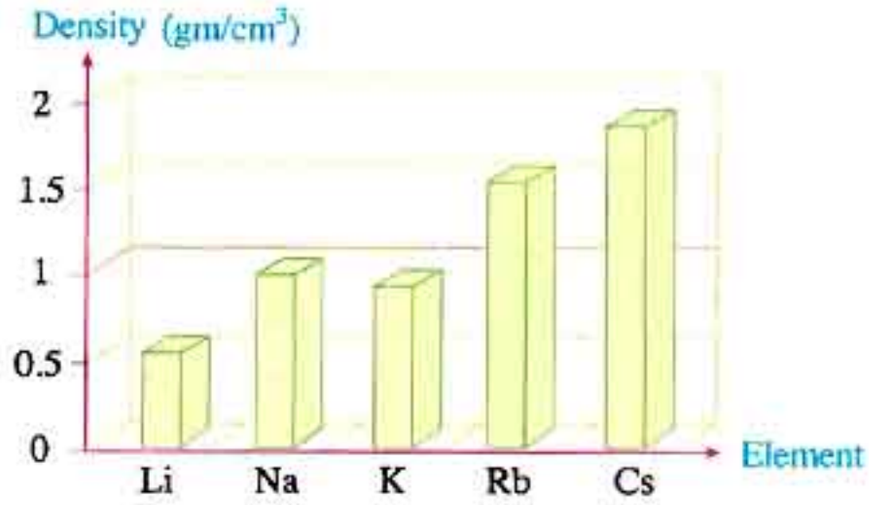
#### A. Physical properties :

**1.** They are **good** conductors of heat and electricity.

**2.** Most of them have **low density**.

From the opposite figure, we can conclude that :

- Lithium (Li), sodium (Na) and potassium (K) elements ***float*** on water surface as their densities are smaller than water density ($1 gm/cm^3$).






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- Rubidium (Rb) and cesium (Cs) elements ***sink*** in water as their densities are greater than water density ($1gm/cm^3$).

**3.** All of them are solids at ordinary temperature and they have metallic lustre.

## B. Chemical properties :

**1.** They are **mono-valent** elements because they have only one electron in their outermost energy levels.

| Element | Its electronic configuration |
|---|---|
| $_3Li$ | 2 , ① |
| $_{11}Na$ | 2 , 8 , ① |
| $_{19}K$ | 2 , 8 , 8 , ① |

**2.** They tend to **lose** their valency (outermost) electrons during the chemical reactions forming ***positive ions***, each of them carries ***one*** positive charge.

$$\underset{\text{Alkali metal}}{M} \xrightarrow{-e^-} \underset{\text{Positive ion}}{M^+}$$

**3.** They are **active** elements so, they are kept under the surface of kerosene or paraffin oil.

**4.** Their chemical activity **increases** as the atomic size **increases**.

Where ***Cesium (Cs)*** *is the most active metal (in the periodic table) as it has the largest atomic size, so it loses its valency electron easily.*




**Note**

Francium is a radioactive element.

**5.** They are named alkali metals as their elements react with water forming ***alkaline solutions***.

## Activity 1 Reaction of alkali metals with water

### Steps :

1. Get a small piece of sodium metal (pea size) and wrap it with a filter paper.
2. Put the sodium piece carefully in a beaker containing some water.
3. Repeat the above steps using potassium instead of sodium.


Reaction of sodium with water


Reaction of potassium with water

### Observations :

- Both sodium and potassium react with water and hydrogen gas evolves which burns with a pop sound (by the effect of the heat produced from the reaction).
- The reaction of potassium with water is more strongly than that of sodium.



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UNIT 1

## Conclusion :

The reaction of potassium with water is stronger than that of sodium because potassium is more active than sodium as its atomic size is larger than that of sodium.

$2Na + 2H_2O \longrightarrow 2NaOH + H_2\uparrow$

Sodium — Water — Sodium hydroxide — Hydrogen gas

$2K + 2H_2O \longrightarrow 2KOH + H_2\uparrow$

Potassium — Water — Potassium hydroxide — Hydrogen gas

GR. • ***Sodium fires are not put off with water.***

Because sodium reacts instantly with water and $H_2$ gas evolves which burns with a pop sound.

TRY TO ANSWER worksheet in the Notebook 7

• ***Sodium is kept under the surface of kerosene.***

To prevent it from the reaction with moist air as it is an active metals.




• ***Hydrogen ($_1H$) locates in group (1A), but it is a non-metallic element.***

Because it has small atomic size and it is a gaseous element.

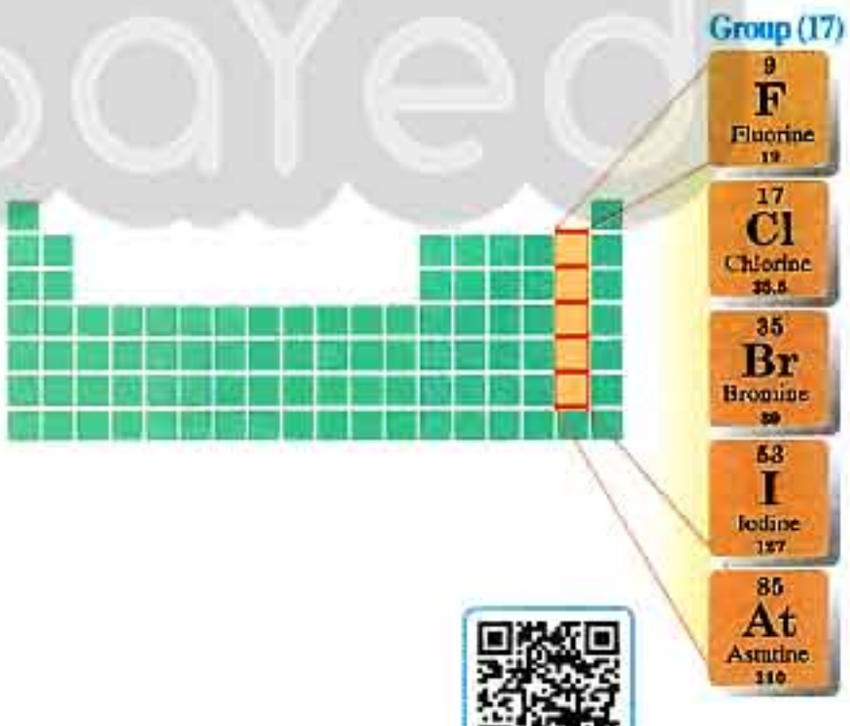
### ▸ Enrichment information

- *In spite of the presence of hydrogen at the top of group 1A, it is not one of alkali metals but it is one of nonmetals because it has small atomic size and it is a gas.*
- *Lithium is not kept under the surface of kerosene because it floats on its surface and burns at once so, it is kept in paraffin oil.*

## 2 Halogens [group (7A)] :

### ➲ Location in the modern periodic table :

- They are located on the right side of the modern periodic table before the inert gases.
- They are elements of group 17 (7A) in p-block.




### ➲ General properties of halogens :

#### A. Physical properties :

1. Their physical state is graduated from gas to liquid to solid as shown in the following table :

| Fluorine | Chlorine | Bromine | Iodine |
|---|---|---|---|
| Gas | | Liquid | Solid |

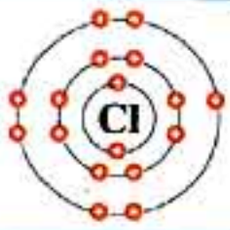
2. They are bad conductors of heat and electricity.



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## B. Chemical properties :

**Ex.:** Chlorine ($_{17}Cl$)




1. They are **mono-valent** elements because their outermost energy levels have (7) electrons.

2. They tend to **gain** one electron during chemical reaction and convert into ***a negative ion*** which has *one* negative charge.

$$\underset{\text{Nonmetal "halogen"}}{M} \xrightarrow{+\,e^-} \underset{\text{Negative ion}}{M^-}$$

**Ex.:** Fluorine molecule ($F_2$) , Chlorine molecule ($Cl_2$), Bromine molecule ($Br_2$) and Iodine molecule ($I_2$).

3. They exist in the form of **diatomic** molecules (formed of two atoms).

4. They are **active** elements, therefore they do not exist in nature in an elementary state but they are found combining with other elements forming chemical compounds [except Astatine (At), which is prepared artificially].

5. They react with metals forming **salts** so, they are called halogens, which means **"Forming salts"**

$$2\,K + Br_2 \longrightarrow 2\,KBr \quad \text{(Potassium bromide)}$$
$$2\,Na + Cl_2 \longrightarrow 2\,NaCl \quad \text{(Sodium chloride)}$$

6. Each element replaces the element **below** it in its salt solution.

## Examples :

$$\underset{\text{Chlorine}}{Cl_2} + \underset{\text{Potassium bromide}}{2\,KBr} \longrightarrow \underset{\text{Potassium chloride}}{2\,KCl} + \underset{\text{Bromine}}{Br_2}$$

$$\underset{\text{Chlorine}}{Cl_2} + \underset{\text{Sodium bromide}}{2\,NaBr} \longrightarrow \underset{\text{Sodium chloride}}{2\,NaCl} + \underset{\text{Bromine}}{Br_2}$$

$$\underset{\text{Bromine}}{Br_2} + \underset{\text{Potassium iodide}}{2\,KI} \longrightarrow \underset{\text{Potassium bromide}}{2\,KBr} + \underset{\text{Iodine}}{I_2}$$

**For illustration :**

*Although fluorine is the most active halogen, but it doesn't replaces other halogens in their salt solutions because it reacts with water which the salt dissolved in.*



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UNIT 1

### ▸ Enrichment information

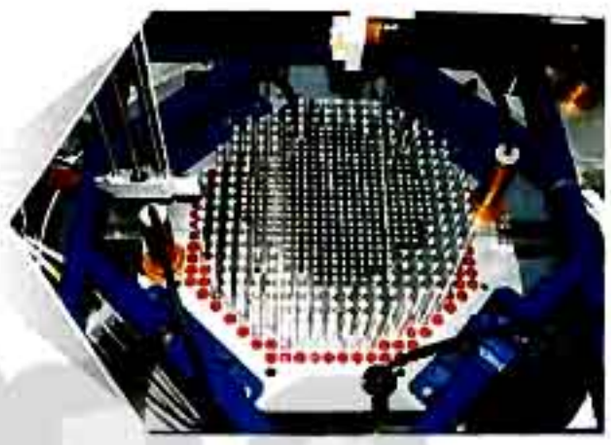
*Chlorine is used in the manufacture of corrector, which is a very volatile liquid. On using it, it becomes dry quickly, leaving a white substance that covers the unwanted ink (writing).*



## Properties of elements and their uses :

- Uses of elements depend on their properties.
- The following table shows the uses of some elements.

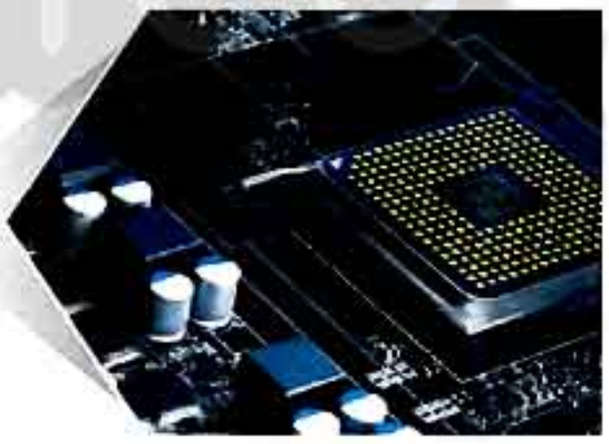
| Element | Its uses |
|---|---|
| ① Sodium 23 Na 11 **Sodium in a liquid state** [Metal] | It is used in a liquid state in transferring heat (as it is a good conductor of heat) from inside the nuclear reactor to outside. This heat is used to obtain the vapour energy required to generate electricity. |
| ② Cobalt 60 Co 27 **Radioactive cobalt 60** [Transition element] 60 is the mass number of cobalt | It is used in food preservation GR. **because it radiates (emits) gamma rays, which prevent the reproduction of microbial cells , but don't harm the human.** |
| ③ Silicon 28 Si 14 **Silicon** [Metalloid] | Silicon slides are used in the manufacture of electronic devices such as computer and transistor GR. **because it is semi-conductor.** (its ability to conduct electricity depends on temperature). |
| ④ Nitrogen 14 N 7 **Liquefied nitrogen** [Non-metal] | It is used in the preservation of cornea of the eye GR. **due to the decrease in its boiling point (–196°C).** |



Core of nuclear reactor



Sterilization of meat by gamma rays



Electronic slide



Liquefied nitrogen



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Lesson Three

## Enrichment information

*The Egyptian scientist Dr : Moustafa El-Sayed got the highest American medal in science for his efforts in the Nanotechnology on 29th September, 2008 and applying this technology in using gold in the treatment of cancer disease.*

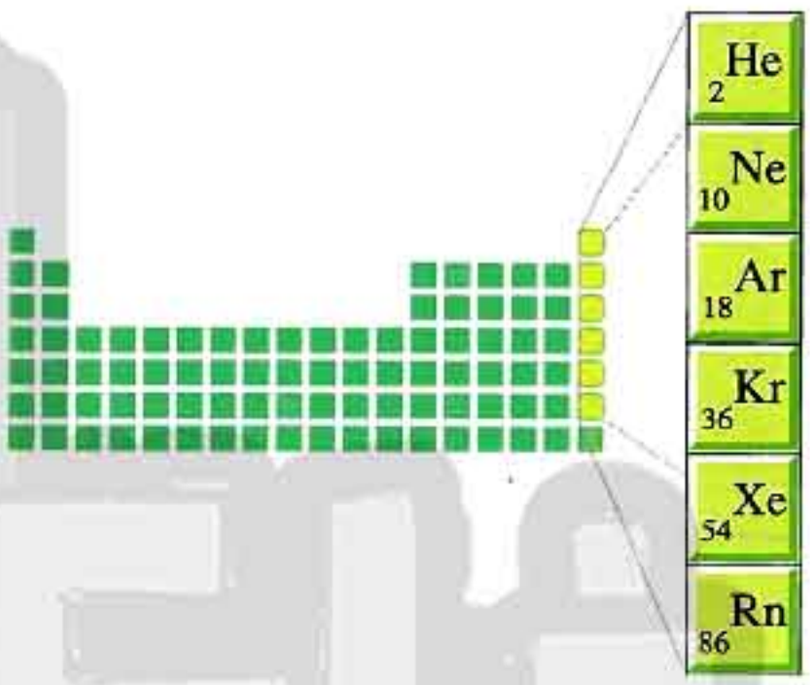


Dr : Moustafa El-Sayed

## 3 Inert gases [ group 18 ] :

### ➲ Location in the modern periodic table :

- They are located on the right side of the modern periodic table following halogens.
- They are elements of zero group which is the last group in p-block.




### ➲ General properties of inert gases :

#### A. Physical property :

- They are present in gaseous state.

#### B. Chemical properties :

1. Their valency equals zero, where its outermost energy levels saturated with electrons.
2. Their outermost energy level contains 8 electrons, except Helium which contain only 2 electrons [ Helium has only (K) energy level ].
3. They are inactive elements, where they don't react with other elements under normal conditions.
4. They exist in the form of monoatomic molecules (formed of one atom only).

**TRY** TO ANSWER worksheets in the Notebook 8 & 9



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## ✪ From the main groups in the periodic table :

### 1. Alkali metals (group 1A) :

- They are the first group of s-block.
- They are located on the left side of the modern periodic table.

**• Properties of alkali metals :**

- They are good conductors of heat and electricity.
- Most of them have low density.
- All of them are solids at ordinary temperature and they have metallic lustre.
- They are mono-valent as they tend to lose their valency electrons during the chemical reaction.
- They are active elements.

### 2. Halogens (group 7A) :

- They are located on the right side of the modern periodic table before the inert gases.

**• Properties of halogens :**

- They are bad conductors of heat and electricity.
- They are mono-valent elements as they tend to gain one electron during the chemical reaction.
- They exist in the form of diatomic molecules.
- They are active elements.

## ✪ Properties of elements and their uses :

- Sodium is used in liquid state in transferring heat from inside the nuclear reactor to outside.
- Cobalt is used in food preservation.
- Silicon slides are used in the manufacture of electronic devices.
- Liquefied nitrogen is used in the preservation of cornea of the eye.



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## 1. Choose the correct answer :

1. Elements of group (1A) are known as .....
   a. halogens. b. alkali metals. c. inert gases. d. alkaline Earth metals.
2. Alkali metals are considered from ..... block groups.
   a. s b. p c. d d. f
3. Which of the following elements is an alkali metal which locates in period three ? .....
   a. $_{3}Li$ b. $_{12}Mg$ c. $_{11}Na$ d. $_{19}K$
4. Elements of group (1A) are reacted with water forming ..... solutions.
   a. acidic b. basic c. neutral d. red
5. Hydrogen element belongs to .....
   a. group (1A). b. group (2A). c. group (6A). d. group (7A).
6. All these elements are monovalent except .....
   a. $_{11}Na$ b. $_{19}K$ c. $_{20}Ca$ d. $_{3}Li$
7. Sodium and potassium are kept under the surface of .....
   a. water. b. kerosene. c. alcohol. d. benzene.
8. The metallic property of alkali metals increases by increasing their .....
   a. electronegativity. b. atomic size. c. valency. d. all are correct.
9. The gas evolved on reacting alkali metal with water is .....
   a. oxygen. b. nitrogen. c. hydrogen. d. helium.
10. Most alkali metals have ..... density.
    a. low b. higher c. equal d. zero
11. All these alkali metals float on water surface except .....
    a. potassium. b. lithium. c. sodium. d. cesium.
12. ..... form positive ions during the chemical reactions.
    a. Nobel gases b. Nonmetals c. Halogens d. Alkali metals
13. All of the following are from the properties of alkali metals except they .....
    a. have low densities. b. are divalent elements.
    c. conduct heat and electricity. d. are active elements.
14. ..... element has higher chemical reactivity.
    a. Sodium b. Lithium c. Potassium d. Cesium
15. 📖 The strongest (most active) metal locates in group .....
    a. 7A b. 1B c. 1A d. 2A



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16. Elements of group (7A) are known as .....
a. inert gases. b. alkali metals.
c. halogens. d. alkaline Earth metals.

17. The outermost energy level of any halogen contains ..... electrons.
a. 2 b. 7 c. 8 d. 9

18. ..... is considered from halogens.
a. Sodium b. Chlorine c. Helium d. Calcium

19. Halogens are considered from ..... block groups.
a. s b. p c. d d. f

20. All these halogens exist in a gaseous state except .....
a. fluorine. b. chlorine. c. iodine. d. (a) and (b).

21. The halogen which exists in a liquid state is .....
a. bromine. b. chlorine. c. fluorine. d. iodine.

22. The molecule of halogen is composed of ..... atom(s).
a. one b. two c. three d. four

23. ..... in its salt solutions.
a. Chlorine replaces bromine b. Bromine replaces fluorine
c. Iodine replaces chlorine d. Iodine replaces fluorine

24. The element(s) which can't replace bromine in its salt solution is (are) .....
a. fluorine. b. iodine. c. chlorine. d. (a) and (b).

25. The halogen, which can be prepared artificially is .....
a. chlorine. b. astatine. c. iodine. d. bromine.

26. Bromine is obtained when chlorine reacts with ..... solution.
a. sodium bromide b. potassium bromide c. sodium iodide d. (a) or (b)

27. Sodium in a liquid state is used in .....
a. nuclear reactors. b. computers. c. fridges. d. sterilization.

28. The element, which is used in the manufacture of transistor is .....
a. S b. Si c. Na d. K

29. The element that emits gamma rays is .....
a. $^{60}Co$ b. $^{23}Na$ c. $^{14}N$ d. $^{35}Cl$

30. ..... rays are used in sterilizing food.
a. Beta b. Alpha c. Gamma d. Laser

31. Cornea is preserved by using .....
a. nitrogen gas. b. liquid paraffin. c. liquefied nitrogen. d. helium gas.

32. The boiling point of liquefied nitrogen is .....
a. 0°C b. 196°C c. 100°C d. – 196°C



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## 2. Put (✓) or (✗) and correct what is wrong :

1. During chemical reactions, alkali metals form positive ions which carry two positive charges. ( )
2. Magnesium and potassium are kept under the surface of kerosene. ( )
3. Lithium is the most active metal in group (1A). ( )
4. Hydrogen gas evolves on reacting sodium with water. ( )
5. Potassium is more active than sodium in group (1A). ( )
6. The chemical activity of group (1A) elements increases as the atomic size increases. ( )
7. Elements of group (1A) are good conductor of heat and electricity. ( )
8. Alkali metals are monovalent elements. ( )
9. Bromine exists in a liquid state, while iodine exists in a gaseous state. ( )
10. Chlorine can replace bromine in its salt solution. ( )
11. Potassium bromide is formed by the reaction of bromine with potassium chloride. ( )
12. Elements of group 18 are known as halogens. ( )
13. Halogens group is from s-block groups. ( )
14. Liquefied nitrogen is used in food preservation. ( )
15. Cobalt 60 emits gamma rays. ( )
16. Sodium is used in the preservation of cornea of the eye. ( )
17. Magnesium slides are used in the manufacture of electronic devices. ( )

## 3. Write the scientific term of each of the following :

1. • The group, which is located on the left edge of the periodic table.
   • The first group of s-block groups in the periodic table.
2. • Elements of group (1A) in the modern periodic table.
   • Monovalent elements exist in s-block in the modern periodic table.
3. The kind of ions which are formed by alkali metals during the chemical reactions.
4. The most active metal in the periodic table.
5. The group, which is located on the right side of the periodic table before group zero.
6. • Elements of group (7A) in the periodic table.
   • Monovalent elements exist in p-block in the periodic table.
7. The halogen, which exists in a solid state.
8. The halogen, which exists in a liquid state.
9. The metal, which is used in a liquid state in transferring heat from inside the nuclear reactor to outside.
10. The radioactive element, which is used in food preservation.
11. The metalloid, which is used in the manufacture of electronic devices.
12. The nonmetal, which is used in preservation of cornea of the eye.



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## 4. Complete the following statements :

1. Elements of group (1A) are named as ..... and they are among ..... block elements.
2. Alkali metals group is located on ..... of the modern periodic table.
3. ..... and ..... elements are among alkali metals.
4. Elements of group (1A) are called alkali metals as their elements react with ..... forming ..... solutions.
5. The valency of alkali metal elements is .....
6. During chemical reactions, alkali metals lose their ..... electrons and change into ..... ions which carry ..... positive charge(s).
7. Alkali metals are ..... metals therefore, they are kept under the surface of ..... or .....
8. Sodium is kept under the surface of ..... to prevent it from the reaction with .....
9. The chemical activity of alkali metals increases as the ..... increases.
10. ..... is the most active metal as it has the largest .....
11. ..... is the alkali metal element, which locates in period three of the periodic table.
12. All alkali metals are good conductors of ..... and .....
13. Lithium and sodium ..... on the surface of water as their densities are ..... than water density.
14. Rubidium and cesium ..... in water as their densities are ..... than water density.
15. Sodium reacts with water giving ..... and ..... gas evolves.
16. The reaction of potassium with water is ..... than the reaction of sodium with water as potassium is ..... active than sodium.
17. Elements of group (7A) are called .....
18. Halogens are among ..... block groups and they are located on the ..... side of the periodic table before ..... gases.
19. The valency of the elements of group (7A) is ..... , as they tend to ..... one electron during the chemical reaction and change into ..... ions.
20. The outermost energy level (valency shell) of alkali metals contains ..... electron(s) , while that of halogens contains ..... electron(s).
21. Fluorine and chlorine exist in a ..... state, while iodine exists in a ..... state.
22. Halogen molecules are ..... molecules as their molecules consist of ..... atoms.
23. Chlorine can replace ..... and ..... in their salt solutions.
24. Bromine reacts with potassium iodide giving ..... and.....
25. ..... is used in food preservation, because it emits ..... rays which prevent reproduction of microbial cells.



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## 5. Complete the following chemical equations :

1. $2Na + \ldots\ldots \longrightarrow 2NaOH + H_2\uparrow$
2. $2K + 2H_2O \longrightarrow \ldots\ldots + \ldots\ldots$
3. $\ldots\ldots + Br_2 \longrightarrow 2KBr$
4. $2Na + Cl_2 \longrightarrow \ldots\ldots$
5. $2NaBr + Cl_2 \longrightarrow \ldots\ldots + \ldots\ldots$
6. $Br_2 + \ldots\ldots \longrightarrow 2KBr + I_2$
7. $Cl_2 + 2KBr \longrightarrow \ldots\ldots + \ldots\ldots$

## 6. Complete the following table :

| Element | Electronic configuration | Period No. | Valency | Group |
|---|---|---|---|---|
| 1. ..... | ..... | 3 | Monovalent | Alkali metals |
| 2. $_3Li$ | ..... | ..... | Monovalent | ..... |
| 3. ..... | 2 , 7 | ..... | ..... | Halogens |
| 4. ..... | 2 , 8 , 8 , 1 | ..... | ..... | ..... |
| 5. $_{17}Cl$ | ..... | ..... | ..... | ..... |

## 7. Give a reason for each of the following :

1. Elements of group (1A) are known as alkali metals.
2. Sodium is kept under the surface of kerosene.
3. Lithium is the lowest active metal in group (1A).
4. Lithium floats on water surface, while cesium sinks in it.
5. Potassium is more active than sodium in group (1A).
6. Sodium fires aren't put off with water.
7. Cesium is the most active metal in the periodic table.
8. Sodium is less active than potassium.
9. Alkali metals are monovalent elements.
10. Elements of group (7A) are known as halogens.
11. Halogens do not exist in nature in elementary state.



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12. During chemical reactions, elements of group (1A) form positive ions, while elements of group (7A) form negative ions.
13. Bromine can't replace chlorine in its salt solution.
14. Both alkali metals and halogens are monovalent elements.
15. 📖 Cobalt- 60 is used in the preservation of food.
16. The liquid sodium is used in nuclear reactors.
17. Silicon slides are used in the manufacture of electronic devices.
18. 📖 Liquefied nitrogen is used in the preservation of cornea of the eye.

## 8. Write chemical equations that illustrate :

1. Reaction of sodium with water.
2. Reaction of potassium with water.
3. Reaction of sodium with chlorine.
4. Reaction of potassium with bromine.
5. Effect of bromine on sodium iodide solution.
6. Reaction of chlorine gas with postassium bromide solution.
7. Passing chlorine gas in potassium iodide solution.

## 9. Mention one use of each of the following elements :

1. 📖 Liquid sodium.
2. 📖 Cobalt - 60
3. 📖 Liquefied nitrogen.
4. 📖 Silicon.
5. Coal

## 10. Choose the odd word (or symbol) and write the scientific term of the rest :

1. Lithium / Sodium / Potassium / Helium.
2. Lithium / Cesium / Sodium / Magnesium.
3. Fluorine / Iodine / Chlorine / Argon / Bromine.

## 11. Compare between :

1. Elements of group (1A) and group (7A) related to : [Name - valency - kind of formed ions - block].
2. Chlorine and bromine [according to the physical state and chemical activity].

## 12. Arrange the following elements in an ascending order according to the metallic property (Giving the reason) :

Sodium ($_{11}Na$), Lithium ($_{3}Li$), Potassium ($_{19}K$) and Cesium ($_{55}Cs$).

## 13. Show by an experiment that :

- Potassium is more active than sodium.



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## 14. Variant questions :

**(1) Classify the following elements into two groups. Each group includes the similar elements in properties, then give an explanation of this classification and mention the name of each group :**

$$_{3}A \ , \ _{9}X \ , \ _{11}E \ , \ _{17}Y \ , \ _{19}G$$

**(2) Write the electronic configuration of the following ions, then write the name of the nearest inert gas to each of them.**

1. $Li^{+}$ 2. $Na^{+}$ 3. $K^{+}$ 4. $Cl^{-}$ 5. $O^{-2}$

**(3) 🕮 The following table shows the properties of three elements (X , Y and Z),**

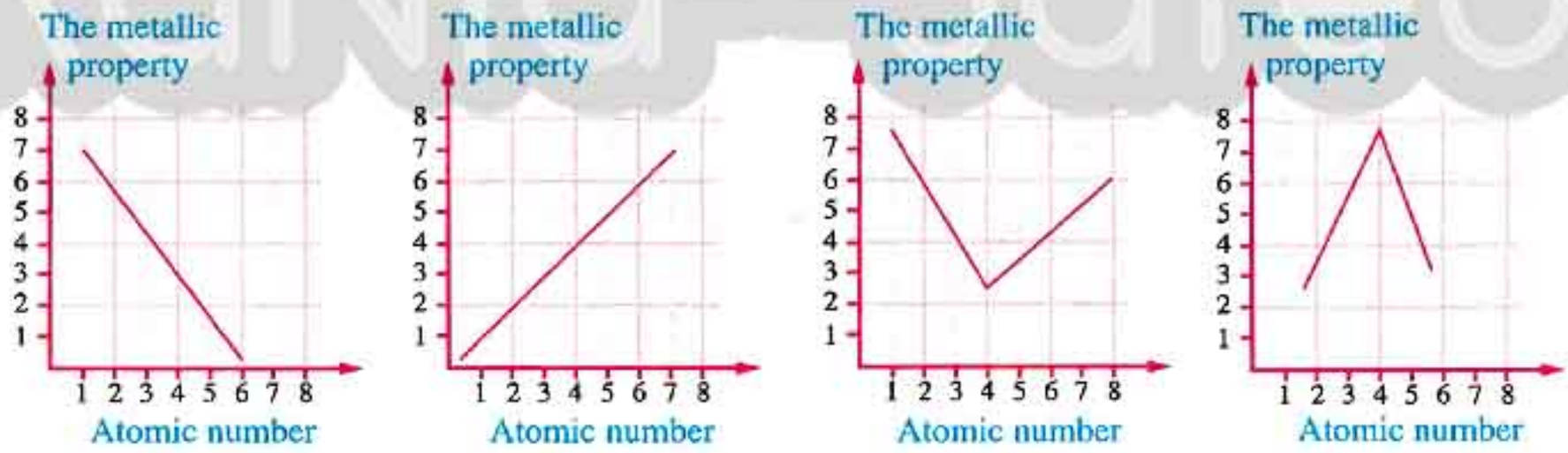
| Element symbol | Behaviour with water | Physical state | Electric conductivity | Density ($gm / cm^3$) |
|---|---|---|---|---|
| X | dissolve | gas | bad conductor | 0.003 |
| Y | react | solid | good conductor | 3.59 |
| Z | react instantly | solid | good conductor | 0.86 |

**Mention the symbol, which represents an element from :**

1. Alkali metals : ..... 2. Halogens : .....

## 15. Study the following figures, then answer the questions :

**(1) Which of the following graph represents the graduation of the metallic property of alkali metals ? Why ?**




**(2) The opposite figure represents a part of a group in the periodic table :**

1. The number of this group is ..... and its elements are called .....
2. The atomic number of element (X) is ..... and the valency of element (L) is .....
3. The outermost energy level of element (Z) contains ..... electrons.
4. Write the names of these elements.

| |
|---|
| X |
| $_{17}Y$ |
| Z |
| L |



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**(3) Study the following figure which represents a section of the periodic table, then answer the following :**

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | | | | | I | K | | L | | N |
| | C | | | | | | | | | | H | | | | | | O |
| B | | | | D | | | E | | F | | G | | J | | | M | |

[NB. The letters in the table don't represent the actual symbols of elements]

1. What is the symbol(s) which indicates the ..... ?
   (a) Inert gases.
   (b) Alkali metals.
   (c) Halogens.
2. What is the symbol which indicates the ..... ?
   (a) Most active metal.
   (b) Most active nonmetal.

**(4) Study the following figure, which represents a part of the modern periodic table, then answer the following :**

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | | | | | | | | | | |
| N | | | | | | | | | | | | | Z | B | J | | |
| X | | | | | | | | | | | | | L | | K | D | |
| | R | | | | | M | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| E | | | | | | | | | | | | | | | | | |

[NB. The letters in the table don't represent the actual symbols of elements]

1. What are the kinds of elements X , M and D ?
2. Mention the atomic number of the element B.
3. Mention the symbol, which represents :
   (a) The most active element in group (1A) and mention the name of this group.
   (b) The element, which has the largest atomic size in period (2).

**(5) Some elements in the periodic table are represented by the letters from A to E and are included in the simplified table as shown below :**

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | H | | | | G |
| A | B | | | | | | | | | | | | | | | D | |
| F | | | | | | | C | | | | | | | | | | E |

[NB. The letters in the table don't represent the actual symbols of elements]



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1. Choose the letter(s), which indicates :

   (a) A halogen.

   (b) The most active metal.

2. Write the chemical equation, which represents the reaction of water with element "A".

3. **Complete:**

   (a) The molecule of element D consists of .....

   (b) The valency of element F is ..... and that of element D is .....

4. What is the type of the oxide of element (A) ?

5. Why does not element (D) exist in a single state in nature ? And what is its physical state in normal temperature ?

6. Arrange the elements A, F and D in an ascending order according to the chemical activity.

**(6) The following figure shows the electronic configuration of atoms of elements in a certian period in the modern periodic table :**




**From this figure :**

A. Mention an element, which belongs to :

   1. Metalloids.
   2. Nobel gases.
   3. Alkali metals.
   4. Nonmetal halogen.

B. Mention an element, whose ion carries three positive charges.

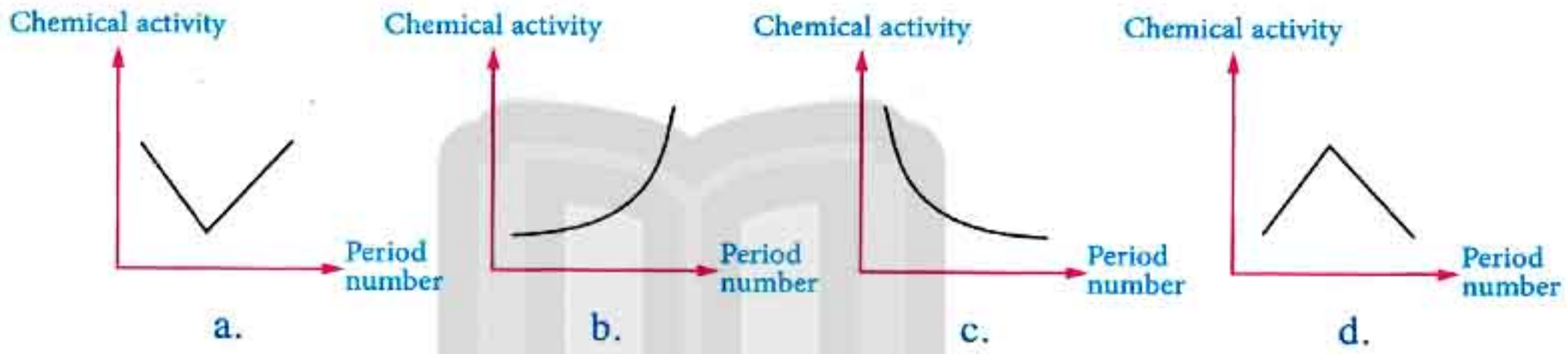


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## 1. Choose the correct answer :

1. Graph number ..... represents the relation between the chemical activity of alkali metals and the period number for each element :




2. X is alkali metal, reacts with element R which belongs to group (15) to form compound whose chemical formula is .....

a. $RX_2$ b. $X_3R$ c. RX d. no correct answer.

## 2. Element X, located in the third period and belongs to alkali metals, while element Y is located in the halogen group and also in the third period. Answer the following questions :

a. What is the atomic number of X and Y ?

b. What is the type of the compound resulted from their combination ? (Mention its formula).

c. Could the element (X) combins with another element which belongs to its group ? (Give a reason for your answer).

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LESSON 4

# Water




## Why

water is an unique matter ?

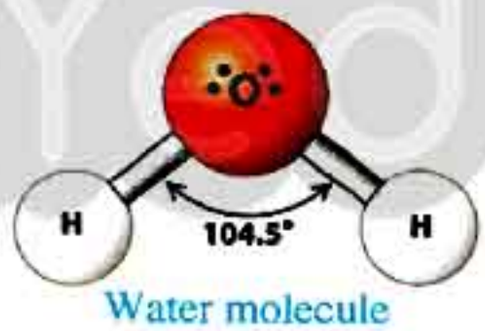
*You have known from the previous studies that water is very important for survival of all living organisms and it has several uses in :*

*- Agricultural fields.  - Industrial fields.  - Personal fields.*

## Structure of water :

- Water molecule is formed of ***one oxygen*** atom (O) with ***two hydrogen*** atoms ($H_2$) joined together by ***two single covalent bonds***, the angle between them is ***104.5°***

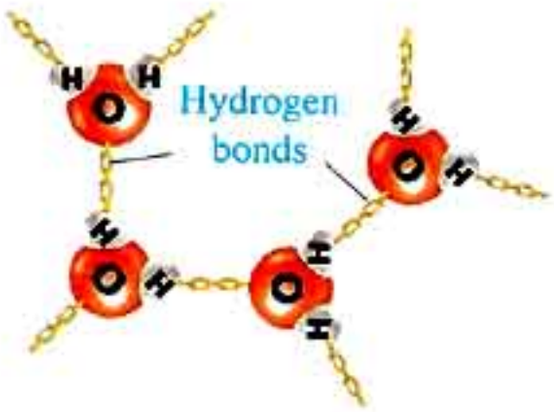
- Due to the higher electronegativity of oxygen with respect to hydrogen, polar water molecules are linked together by "***hydrogen bonds***".



Water molecule

## Hydrogen bond:

It is a weak electrostatic attraction force that arises between the molecules of polar compounds (as water molecules).




## Notes

- A hydrogen bond is weaker than a covalent bond.
- A hydrogen bond is responsible for the abnormal properties of water.



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UNIT 1

## Some properties of water

- **A Physical properties**
  1. It exists in three states
  2. It is a good polar solvent
  3. Rising of its boiling & its freezing points
  4. Its density decreases on freezing
- **B Chemical properties**
  1. It has a neutral effect on litmus paper
  2. Electrolysis of water

## A Physical properties of water :

### 1 Water exists in three states :

Water is an unique matter due to its existence in three states which are **solid state** (ice), **liquid state** (water) and **gaseous state** (water vapour) at the ordinary temperature.



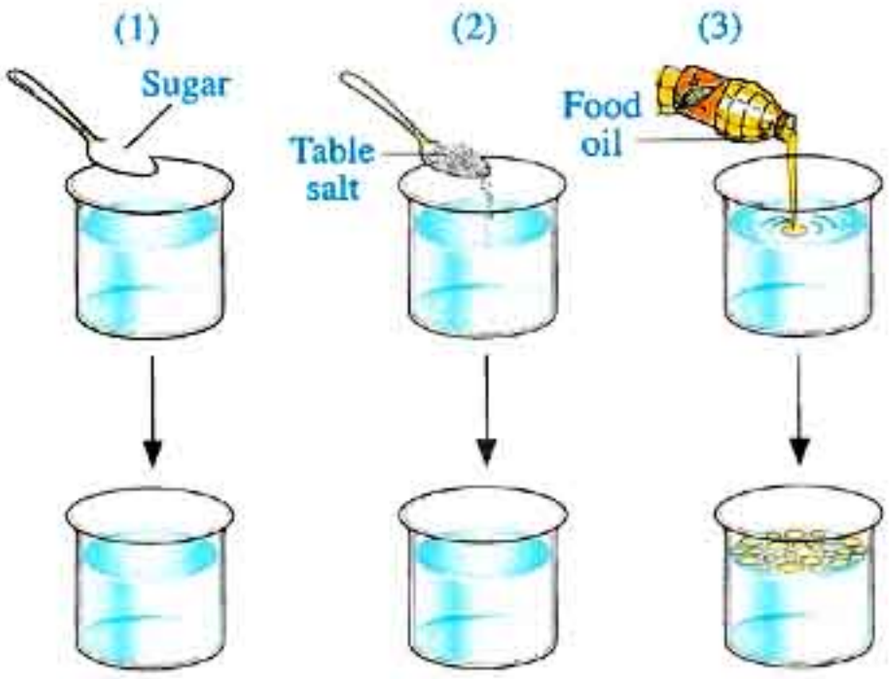
States of water

### 2 Water is a good polar solvent :

**ACTIVITY 1** To prove that water is a good polar solvent :

**Steps :**

1. Put an amount of water in three glass beakers.
2. Put a spoon of sugar in the first beaker, a spoon of table salt in the second and some drops of food oil in the third with stirring.




**Observation :**

Both sugar and table salt dissolve in water, while oil doesn't dissolve.



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## Conclusion :

- **Water is a good polar solvent for :**
  1. Most ionic compounds such as sodium chloride (table salt) , which dissolves easily.
  2. Some covalent compounds such as sugar, which dissolves easily as it can form hydrogen bonds with water.
- **Most covalent compounds as oil, cannot dissolve as it cannot form hydrogen bonds with water.**

## 3 Rising of water boiling point and its freezing point :

**It was supposed that :**

| The boiling point of water is less than (100°C) | The freezing point of water is less than (0°C) |
|---|---|

**But in the normal atmospheric pressure :**

| Pure water boils at 100°C | Pure water freezes at 0°C |
|---|---|

This is due to the presence of Hydrogen bonds between its molecules

## 4 Water density decreases on freezing :

- Water is not like other matters, where its density in solid state (ice) is **lower than** its density in liquid state (water) GR.

  This is because when the temperature of water becomes less than 4°C, water molecules are collected together by hydrogen bonds forming **ice crystals which have hexagonal shape**, large volume and large number of spaces between them and so, its density decreases.
- For this reason ice crystals float on the water surface and this helps in the preservation of the life of aquatic creatures that live in deep water.



Ice crystals

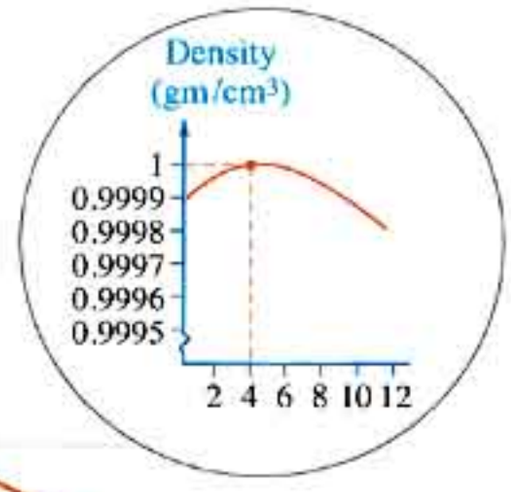


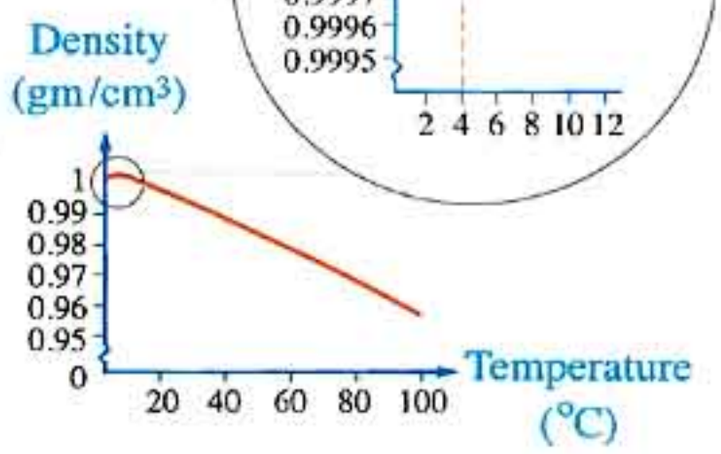
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UNIT 1

➲ **The opposite figure shows the change of water density by changing its temperature, where :**

- The highest value of density of pure water at 4°C.
- The lowest value of density of pure water at 0°C.




GR. • ***When water freezes, its mass doesn't change.***

Because on freezing, the amount of decreases in its density is compensated by the amount of increases in its volume, so its mass remains constant.

• ***Although water of oceans freezes at polar zones, the aquatic creatures are still alive.***

Because when the temperature of water becomes less than 4°C, it forms a layer of ice, which floats on the water surface and this provides the creatures with the chance to be still alive.



• ***On putting a glass bottle completely filled with water in a freezer, it breaks (explodes).***

Because when water freezes, its volume increases so, the bottle breaks (explodes).



**Enrichment information**

*The density of salt water is larger than that of fresh water, so swimming in the sea is more easier than swimming in swimming pools.*

**Life application** **Dissolving the ice of the freezer quickly :**

- It is possible to dissolve the ice of the freezer quickly after disconnecting the electric current from the fridge in two ways :
  - Putting a hot water container in the freezer and close the fridge.
  - Using a hair dryer to direct a hot air current to the formed ice.

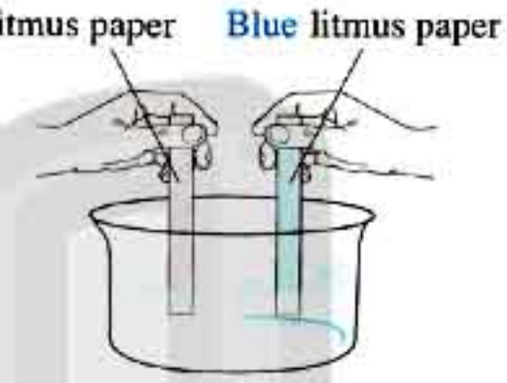


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## B Chemical properties of water :

### 1 Water has a neutral effect on litmus paper :

**ACTIVITY 2** **Water has a neutral effect on litmus paper :**

| Step | Illustrating figure | Observation |
|---|---|---|
| Put two litmus papers (blue and red) in a basin containing pure water. |   | The colour of the two papers (blue and red) doesn't change. |

**Conclusion :**

The pure water has a neutral effect on blue and red litmus papers.

**GR** ***Pure water has a neutral effect on litmus solutions.***

Because pure water is formed of equal numbers of :

- Positive hydrogen ions $(H)^{+}$, which are responsible for the acidic property.
- Negative hydroxide ions $(OH)^{-}$, which are responsible for the basic property.

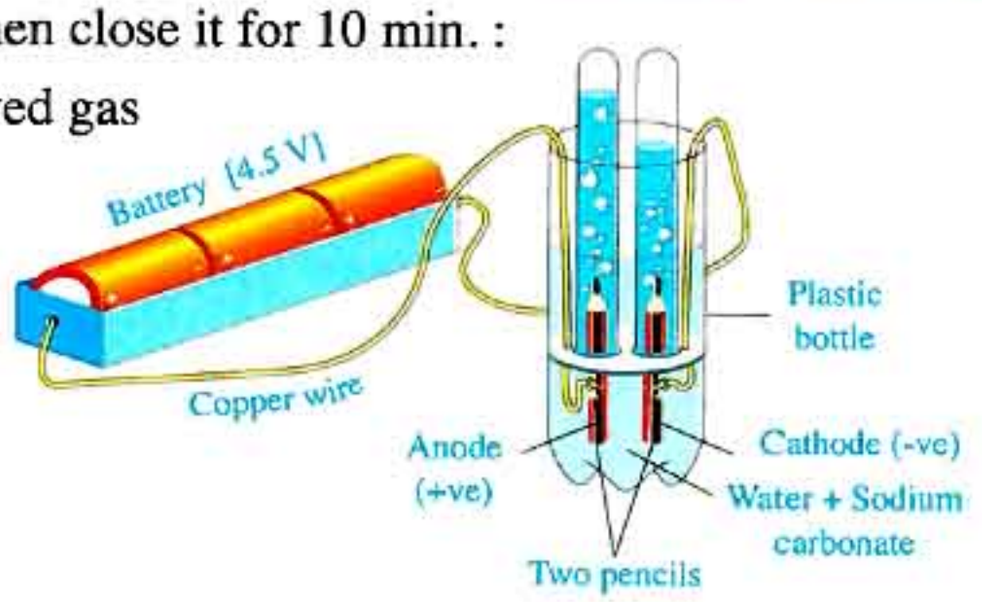
### 2 Electrolysis of water :

**ACTIVITY 3** **Water electrolysis :**

**Steps :**

Connect the circuit as shown in the figure, then close it for 10 min. :

1. Compare between the volume of the evolved gas above the negative pole (cathode) and the volume of the evolved gas above the positive pole (anode).
2. Approach a glowing splint to the gas evolved at both cathode and anode.






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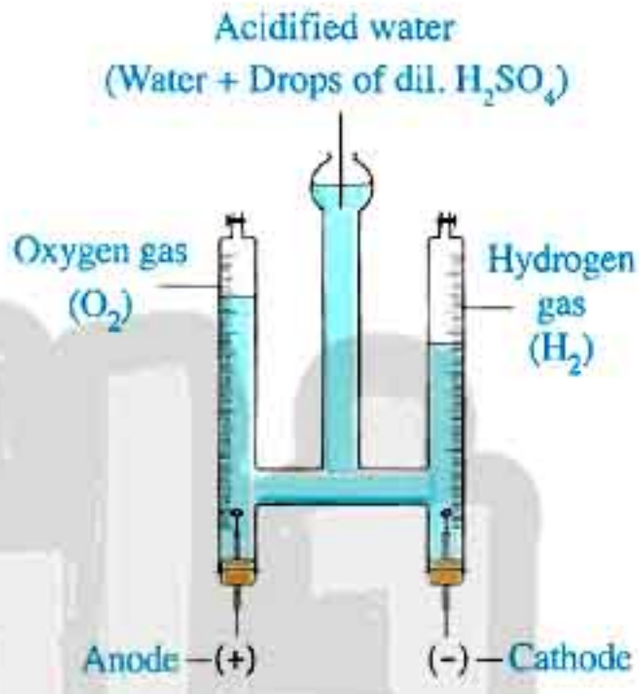
## Observations :

1. The volume of the evolved gas above the cathode doubled the volume of the evolved gas above the anode.
2. The evolved gas above the anode makes the glowing splint more glowing, while the evolved gas above the cathode burns with a pop sound.

## Conclusion :

- The acidified water decomposes by electricity into :
  - **Oxygen gas** evolves at the **anode**.
  - **Hydrogen gas** evolves at the **cathode**.
- The ratio between the produced hydrogen gas and oxygen gas is about (2 : 1) by volume because water molecule ($H_2O$) is composed of two hydrogen atoms and one oxygen atom.

$$2H_2O \xrightarrow[\text{dil. } H_2SO_4]{\text{Electrolysis}} 2H_2\uparrow + O_2\uparrow$$



"Hofmann's Voltameter"

* **The previous activity shows** : *The idea of work of the* ***Hofmann's voltameter*** *which is used for the electrolysis of acidified water as shown in the opposite figure.*

## Exercise 1

***Calculate the volume of hydrogen gas ($H_2$) that evolves at the negative pole if you know that the volume of oxygen gas that evolves at the positive pole of Hofmann's Voltameter is 2 $cm^3$.***

### Answer

∵ The volume of hydrogen gas = 2 × the volume of oxygen gas.

∴ The volume of hydrogen gas = 2 × 2 = 4 $cm^3$.

GR. ***Adding few drops of dilute sulphuric acid to water during its electrolysis by Hofmann's voltameter.***

Because pure water is a bad conductor of electricity (as it is weakly ionized), but acidified water conducts electricity.

TRY TO ANSWER worksheet in the Notebook 10



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Lesson Four

## Water pollution :

- The continuous increase in agricultural and industrial activities leads to water pollution.
- Water pollution can be defined as follows :

**Water pollution**

It is the addition of any substance to the water which causes continuous gradual change in water properties affecting the health and the life of living creatures.



## Water pollutants and their harms :

Environmental pollutants can be divided into

1. Natural pollutants
2. Artificial pollutants

### 1 Natural pollutants :

They arise from natural phenomena such as :

- Volcanic eruptions.
- Death of living organisms.
- Lightning accompanying thunder storms.

### 2 Artificial pollutants :

They arise from different human activities such as :

- Burning coal and oil, which leads to the formation of acidic rains and smog.
- The overuse of chemical insecticides and fertilizers.
- Throwing sewage and factories wastes and leakage of petroleum oil in the seas and rivers.

## Exercise 2

***Complete the following statement :***

***Volcanic eruptions are considered as one of ..... pollutant, which causes ..... change in water properties.***

**Answer**

natural – continuous gradual.



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UNIT 1

## Types of water pollution :

- Water pollution is classified into 4 classes as shown in the following table :

| Kinds of pollution | causes (origins) | harms (damages) |
|---|---|---|
| ① **Biological pollution** |  Water pollution with animals' wastes<br>Mixing animals and human wastes with water. | The infection with many diseases such as : **bilharzia, typhoid and hepatitis**. |
| ② **Chemical pollution** |  Discharging sewage in canals<br>Discharging factories residues and sewage in seas, rivers and canals. | The increase in some elements concentration causing great harms as :<br>1. Eating fish, which contain high concentration of **lead** causes **the death of brain cells**.<br>2. Increasing the **mercury** concentration in drinking water causes **blindness**.<br>3. **Arsenic** increases the occurrence rates of **liver cancer**. |
| ③ **Thermal pollution** |  Nuclear reactor<br>Increasing the temperature of marine water in which it used for cooling the nuclear reactors. |  Death of marine creatures<br>Death of marine creatures due to the separation of the dissolved oxygen from water. |
| ④ **Radiant pollution** | - Dumping the atomic wastes in oceans and seas.<br>- Leakage of radioactive materials from nuclear reactors. | **For illustration**<br>*- Increase in occurrence rates of cancer.* |

**Notice :**

The nuclear reactors cause both thermal and radiant pollutions.



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Lesson Four

## Protection of water from pollution :

- **There are many behaviours that must be taken in consideration to protect water from pollution in Egypt, such as :**

1. Prevention of getting rid of sewage, wastes of factories and dead animals in rivers or canals.



2. Developing the stations of water purification and doing a periodical analysis to water used in drinking.



3. Disinfection of the drinking water tanks which are found on the roofs of buildings in a periodical manner.



4. Don't store the tap water in empty plastic bottles GR. **because plastic reacts with chlorine gas (which is used as water disinfectant) leading to the increase in the occurrence rates of cancer.**



5. Spreading environmental awareness among people to protect water from pollution.



**TRY** TO ANSWER worksheet 11
- General Exercise of the School Book on Unit 1
- Model exams on Unit 1

in the Notebook



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- Water molecule is formed of one oxygen atom (O) with two hydrogen atoms ($H_2$) joined together by two single covalent bonds.

- **Hydrogen bond :** It is a weak electrostatic attraction force that arises between the molecules of polar compounds.

- **Physical properties of water :**
  - Water exists in three states which are solid, liquid and gaseous.
  - Water is a good polar solvent.
  - Pure water in the normal atmospheric pressure boils at (100°C) and freezes at (0°C).
  - Density of water in solid state is lower than its density in the liquid state.

- **Chemical properties of water :**
  - It has a neutral effect on litmus paper.
  - It can be decomposed electrically.
  - Hofmann's voltameter is used for the electrolysis of acidified water as shown in the following equation :

$$2H_2O \xrightarrow[\text{dil. } H_2SO_4]{\text{Electrolysis}} 2H_2\uparrow + O_2\uparrow$$

- **Water pollution :**

It is the addition of any substance to the water, which causes continuous gradual change in water properties affecting the health and the life of living creatures.



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## 1. Choose the correct answer :

1. Water molecule is composed of .....
   a. one oxygen atom and one hydrogen atom.
   b. two oxygen atoms and one hydrogen atom.
   c. one oxygen atom and two hydrogen atoms.
   d. two oxygen atoms and two hydrogen atoms.
2. In a water molecule, oxygen atom combines with two hydrogen atoms by two ..... bonds.
   a. double covalent  b. ionic
   c. single covalent  d. hydrogen
3. In a water molecule, the angle between the two single covalent bonds is .....
   a. 64°  b. 104°  c. 104.5°  d. 140.5°
4. 📖 There are ..... bonds among the water molecules.
   a. metallic  b. ionic  c. hydrogen  d. covalent
5. Water exists in ..... in normal temperatures.
   a. solid state only  b. liquid state only
   c. gaseous state only  d. (a) , (b) and (c)
6. Water can dissolve .....
   a. table salt.  b. sugar.  c. oil.  d. (a) and (b).
7. The high boiling point of water is due to the presence of ..... bonds.
   a. single covalent  b. double covalent  c. hydrogen  d. ionic
8. The snow crystal has ..... shape.
   a. octagonal  b. quadrilateral  c. pentagonal  d. hexagonal
9. Ice crystals are characterized by all the following except they have .....
   a. low density.  b. large volume.
   c. hexagonal shape.  d. high density.
10. A bottle is filled completely with water and put closed in the freezer.
    After sometime it breaks, because when water freezes .....
    a. its density increases and its volume remains constant.
    b. its volume increases and its density remains constant.
    c. its volume increases and its density decreases.
    d. its density increases and its volume decreases.



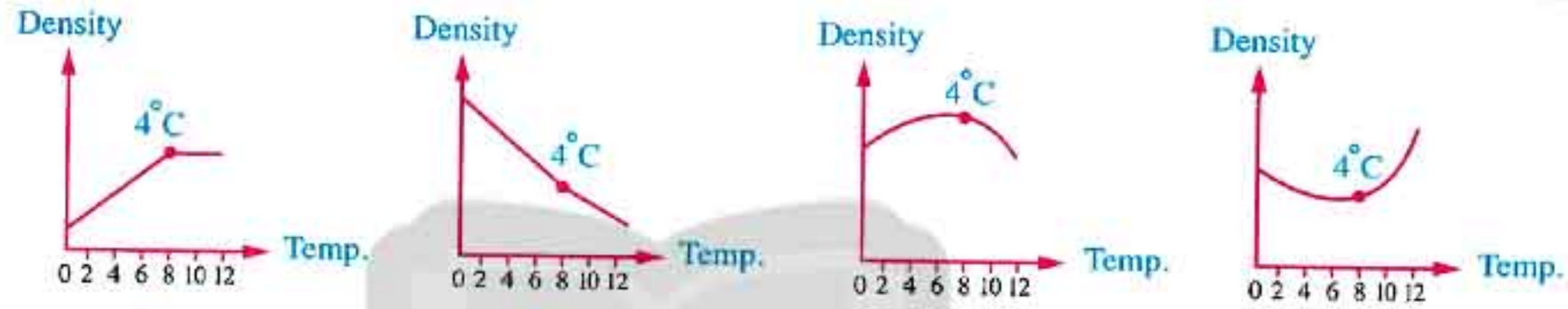
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UNIT 1

11. The density of pure water in a solid state is .....
a. less than its density in liquid state.
b. equal to its density in vapour state.
c. greater than its density in liquid state.
d. less than its density in vapour state.

12. The pure water boils at ..... °C.
a. 0
b. 4
c. 90
d. 100

13. The figure ..... represents the change in water density by changing the temperature.



a. b. c. d.

14. Water has a/an ..... effect on litmus paper.
a. basic
b. acidic
c. neutral
d. alkaline

15. 📖 All the following are among the properties of water except .....
a. it has neutral effect on litmus paper.
b. it is a polar compound.
c. its volume increases by freezing.
d. it decomposes by heat into its elements.

16. 📖 A liquid boils at 100°C. What is the other property, which confirms that it is pure water ? .....
a. It dissolves table salt.
b. Its density decreases on freezing.
c. It has a neutral effect on litmus paper.
d. It evaporates on heating.

17. The electrolysis of acidified water gives hydrogen gas and oxygen gas at a ratio of ..... by volume.
a. 2 : 1
b. 1 : 3
c. 1 : 2
d. 2 : 3

18. In the electrolysis of acidified water by using "Hofmann's voltameter", the volume of hydrogen gas that evolves is (40 $cm^3$), so the volume of oxygen gas that evolves is ..... $cm^3$.
a. 80
b. 40
c. 20
d. 10

19. The volume of hydrogen gas evolving from water electrolysis equals ..... the oxygen volume.
a. that of
b. double
c. half
d. four times

20. All the following are natural water pollutants except .....
a. volcanic eruptions.
b. death of living organisms.
c. discharge of factories residues.
d. lightning accompanying thunder storms.

21. Mixing animals and human wastes with water causes ..... pollution.
a. chemical
b. biological
c. thermal
d. radiant

22. All the following diseases are caused by biological pollution except ..... disease.
a. cancer
b. bilharzia
c. hepatitis
d. typhoid

23. Increasing the concentration of ..... in drinking water causes blindness.
a. lead
b. arsenic
c. mercury
d. chlorine



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24. Arsenic increases the infection rate by .....
a. liver cancer. b. brain cancer. c. hepatitis. d. typhoid.

25. ..... pollution causes the death of marine creatures due to the separation of the dissolved oxygen from water.
a. Biological b. Chemical c. Thermal d. Radiant

26. Which of the following behaviours causes radiant pollution ? .....
a. Discharging of sewage in seas.
b. Leakage of radioactive materials from nuclear reactor.
c. Discharging factories residues and chemicals in seas.
d. (b) and (c) are correct.

## 2. Choose from column (B) what suits it in column (A) :

| (A) Harms | (B) Pollutant |
|---|---|
| 1. Death of brain cells. | a. Lead |
| 2. Liver cancer. | b. Sodium |
| 3. Blindness. | c. Mercury |
| | d. Arsenic |

## 3. Put (✓) or (✗) and correct the wrong ones :

1. Water molecule consists of one hydrogen atom and two oxygen atoms. ( )
2. Water is a non-polar solvent. ( )
3. Water molecules are linked together by ionic bonds. ( )
4. Water molecule contains one double covalent bond. ( )
5. Covalent bond is stronger than hydrogen bond. ( )
6. Both oil and sugar are covalent compounds. ( )
7. The density of water in liquid state is higher than its density in the solid state. ( )
8. Water density increases on freezing. ( )
9. Ice crystals have round shape and small volume. ( )
10. Water has a neutral effect on litmus solution. ( )
11. During electrolysis of acidified water, the volume of the evolved gas above the anode is half the volume of the evolved gas above the cathode. ( )
12. During electrolysis of acidified water, oxygen gas evolves at the cathode, while hydrogen gas evolves at the anode. ( )
13. Hofmann's voltameter is used for water ionization. ( )
14. Volcanic eruptions and lightning accompanying thunder storms are from artificial water pollutants. ( )
15. Chemical pollution of water causes many diseases such as typhoid and hepatitis. ( )
16. Eating food containing high concentration of mercury causes the death of brain cells. ( )
17. Discharging factories residues in seas and rivers causes radiant pollution. ( )



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Unit 1

13. Hofmann's voltameter is used for water ionization. ( )
14. Volcanic eruptions and lightning accompanied by thunder storms are from artificial environmental pollutants. ( )
15. Chemical pollution of water causes many diseases such as typhoid and hepatitis. ( )
16. Eating food containing high concentration of mercury causes the death of brain cells. ( )
17. Discharging factories residues in seas and rivers causes radiant water pollution. ( )

## 4. Write the scientific term of each of the following :

1. A molecule that consists of two hydrogen atoms and one oxygen atom.
2. A kind of bonds, which arises between oxygen atom and each of hydrogen atoms in water molecule.
3. • A type of weak electrostatic attraction which arises among molecules of some polar compounds.
   • A chemical bond arises between water molecules and each other.
   • A type of bond which is responsible for the abnormal properties of water.
4. A good polar solvent for most of ionic compounds and some of covalent compounds.
5. The apparatus which is used in water electrolysis.
6. The positive pole in Hofmann's voltameter.
7. • The gas which evolves above the anode during water electrolysis.
   • The gas which makes the glowing splint more glowing.
8. The negative pole in Hofmann's voltameter.
9. • The gas which evolves above the cathode during water electrolysis.
   • The gas which burns with a pop sound.
10. The addition of any substance to water, which causes continuous gradual change in water properties affecting the health and life of living creatures.
11. A kind of environmental pollutants, which arises from natural phenomenon.
12. A kind of environmental pollutants, which arises from different human activities.
13. • A kind of water pollution, which arises from mixing animal and human wastes with water.
    • A kind of water pollution, which causes the infection by many diseases such as typhoid.
14. A kind of water pollution which arises from the discharge of factories wastes and sewage in seas and rivers.
15. A water pollutant which causes the death of brain cells.
16. A water pollutant which causes blindness when its concentration increases in water.
17. A water pollutant which increases the infection rate by liver cancer.
18. • A type of water pollution that results from the increase in the temperature of water which is used in cooling nuclear reactors.
    • A type of water pollution, which causes the death of marine creatures due to the separation of the dissolved oxygen in water.
19. A kind of water pollution, which results from dumping atomic wastes in the oceans and seas.



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## 5. Complete the following statements :

1. Water is used in many fields such as ..... , ..... and .....
2. Water molecule is composed of one ..... atom and two ..... atoms.
3. Water molecules are linked together by ..... bond due to the higher ..... of oxygen with respect to hydrogen.
4. The bond between hydrogen atom and oxygen atom in water molecule is ..... bond, while bonds among water molecules are ..... bonds.
5. Water is a good polar ..... as it has the ability to dissolve most ..... compounds.
6. ..... is an example of ionic compounds, while ..... is an example of covalent compounds, which dissolve in water.
7. Some covalent compounds such as ..... can't dissolve in water as they can't form ..... bonds with water.
8. Pure water boils at ..... and freezes at .....
9. The high boiling point of water is due to the presence of ..... bond between its .....
10. When the temperature of water becomes less than 4°C, its density ..... , while its volume .....
11. When the temperature of water decreases below ....., its molecules are collected together by ..... bonds forming ice crystals.
12. Ice crystals have ..... shape and large .....
13. Water has a ..... effect on litmus paper.
14. ..... is an apparatus which is used for the electrolysis of water by using ..... energy.
15. In Hofmann's voltameter, the positive pole is called ..... , while the negative pole is called .....
16. During the electrolysis of acidified water by Hofmann's voltameter, ..... gas evolves at the anode, while ..... gas evolves at the cathode.
17. If the volume of the evolved gas at the anode in Hofmann's voltameter is 7 $cm^3$ therefore, the volume of the evolved ..... gas at the cathode is ..... $cm^3$.
18. Environmental pollutants are classified into ..... pollutants and ..... pollutants.
19. Water pollution is classified into four main types, which are ..... , chemical, ..... and ..... pollution.
20. Biological water pollution causes the infection by many diseases such as ..... , typhoid and .....
21. Eating food containing high concentration of ..... causes the death of the ..... cells.
22. Increasing the mercury concentration in drinking water causes ..... , while increasing arsenic concentration in it, increases the infection rate by .....
23. Mixing animals and human wastes with water causes ..... water pollution, while dumping atomic wastes in oceans causes ..... water pollution.



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UNIT 1

27. We must not store the tap water in ..... bottles because plastic reacts with ..... gas leading to the increase in the infection rates by .....

**6.**

| Water pollutant | Kind | Harms |
|---|---|---|
| 1. Discharging of factories residues and sewage in seas and rivers. | ..... Pollution | • Blindness<br>• .....<br>• ..... |
| 2. ..... ..... | Biological Pollution | • .....<br>• Typhoid<br>• ..... |
| 3. ..... ..... | Radiant Pollution | |
| 4. Using some water areas in cooling of nuclear reactors. | ..... Pollution | ..... |

## 7. Give reasons for the following :

1. Water molecule is from polar molecules.
2. 📖 The high boiling point of water.
3. 📖 The presence of hydrogen bonds between water molecules.
4. Water has the ability to dissolve most ionic compounds.
5. 📖 Dissolving of sugar in water although it is among covalent compounds.
6. Ice floats on the water surface.
7. Although water of oceans freezes at polar zones, the aquatic creatures are still alive.
8. The density of water decreases by decreasing its temperature than 4°C.
9. The volume of 5 gm of ice is more than the volume of 5 gm of water at 4°C.
10. On putting a glass bottle completely filled with water in a freezer, it will break.
11. Pure water has no effect on litmus solutions.
12. Adding few drops of dilute sulphuric acid to water during its electrolysis by Hofmann's voltameter.
13. The glowing of splint increases by approaching it to the anode of voltameter during electrolysis of acidified water.
14. Biological water pollution affect the human health.
15. We should keep water free from any pollution.
16. It is dangerous to eat fish containing high concentration of lead.
17. Death of marine creatures in the water areas in which the water is used in cooling the nuclear reactors.
18. We should not keep the tap water in plastic bottles.



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## 8. What is meant by ....?

1. Hydrogen bond.
2. 📖 Water pollution.

## 9. What will happen in each of the following cases ....?

1. Putting a glass bottle filled with water in the freezer for a long time.
2. Decrease in water temperature to 4°C.
3. Passing of electric current through Hofmann's voltameter containing acidified water.
4. 📖 The pollution of water with animal and human wastes.
5. 📖 Storing water in plastic bottles.
6. Increase in the ratio of arsenic in food.
7. Increase in the concentration of mercury in drinking water.
8. Eating fish contains high concentration of lead.

## 10. 📖 What is the effect of each of the following on the water environment ?

1. Mixing animal and human wastes with water.
2. The discharge of factories wastes in seas and rivers.
3. The use of seas and rivers water as a source of cooling the nuclear reactors process.

## 11. Mention one difference between each of the following :

1. Natural water pollutants and artificial water pollutants.
2. Biological water pollution and chemical water pollution.
3. Thermal water pollution and radiant water pollution.
4. Table salt and oil.
5. Pure water and acidified water.
6. The covalent bond and the hydrogen bond.

## 12. Write short notes about :

1. Properties of water.
2. The relation between water density and its temperature.
3. Water is a good polar solvent.
4. Artificial water pollutants.

## 13. 📖 Explain each of the following :

1. The nuclear reactors cause thermal and radiant water pollution.
2. How to protect water from pollution ? (three points).



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UNIT 1

## 14. Mention the importance of :

1. Hofmann's voltameter.
2. Preventing of getting rid of factories residues and sewage in seas and rivers.
3. Preventing mixing animal and human wastes with water.

## 15. Explain an activity that illustrates that :

1. Water is a good polar solvent.
2. Water has a neutral effect on litmus paper.

## 16. Draw a diagrammatic figure with labels for the device which is used in the electrolysis of water.

(Mention the equation of the reaction).

## 17. Study the following figures, then answer the questions :

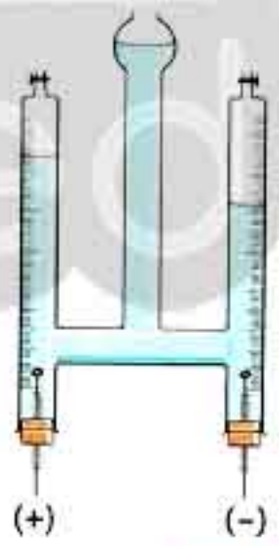
**(1) From the opposite figure, answer the following :**

1. What are the temperatures at points (A) & (B) ?
2. At which point the density of water is the largest ?



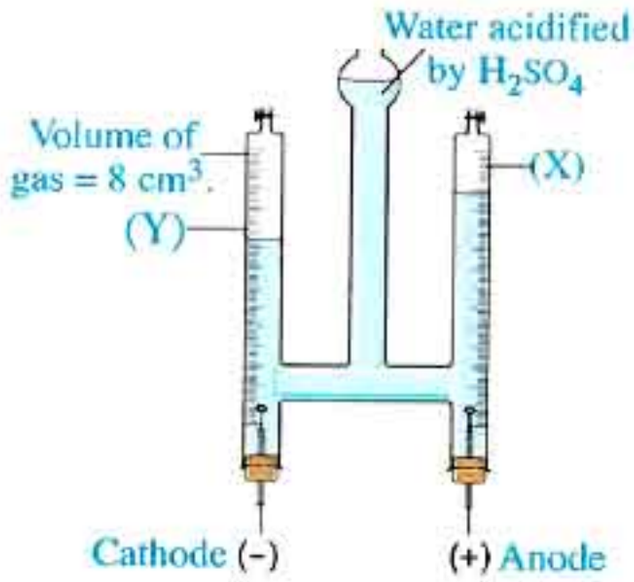

**(2) The opposite figure represents Hofmann's voltameter which is used in water electrolysis :**

1. Write the chemical equation, which expresses the reaction.
2. What is the volume of the gas, which burns with a pop sound on approaching a glowing splint to it, if the volume of the other gas is 6 $cm^3$ ?




**(3) During the electrolysis of acidified water by using Hofmann's voltameter (as shown in the opposite fig.), it was found that the volume of the collected gas in branch Y = 8 $cm^3$.**

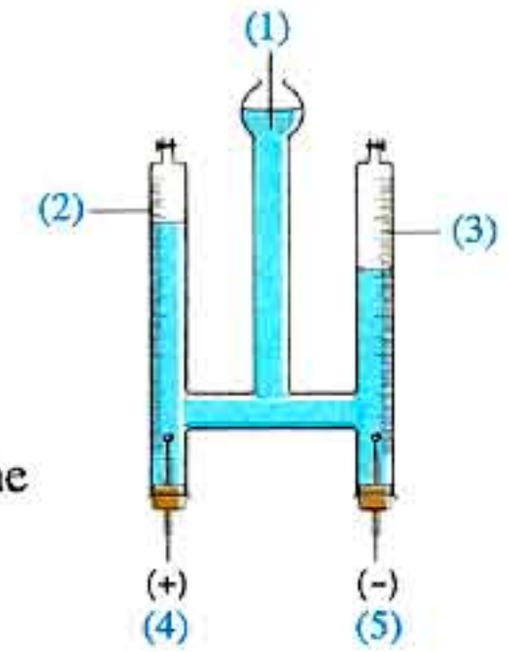
1. What is the name of the collected gas in each of the two branches (X & Y) of the voltameter ?
2. What is the volume of the gas in branch (X) ?





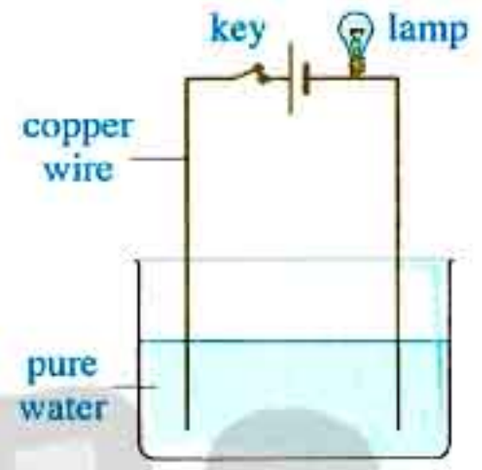

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**(4) From the opposite figure, answer the following questions :**




1. What is the name of this apparatus ?
2. Label the numbers (1) , (2) , (3) , (4) and (5).
3. What happens if a glowing splint is put above the anode and the cathode ?
4. Calculate the volume of the gas that evolves at the anode if the volume of the gas that evolves at the cathode is 20 $cm^3$. (Mention the reason).

**(5) From the opposite electric circuit :**




(a) Does the lamp illuminate or not ? **(Give a reason)**.

(b) What will happen if you add drops of sodium carbonate to the pure water ? **(Give a reason)**.

رانيا سيد RaNia SaYed



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## 1. Choose the correct answer :

1. The ratio between the density of water at 4°C to its density at zero°C is ..... one.

a. more than  b. less than  c. equal to

2. The density of pure water in the solid state is ..... 1 gm/cm$^3$.

a. more than  b. equal to  c. less than

3. 📖 When we put 1 liter of water at 4°C in the freezer to change it into ice, its mass .....

a. increases.  b. decreases.  c. doesn't change.

4. The volume of a quantity of water at 10°C is ..... the volume of the same quantity at 1°C.

a. more than  b. equal to  c. less than

5. If the summation of the volume of the two evolved gases at the two poles of Hofmann's voltmeter is 60 cm$^3$, so the volume of hydrogen and oxygen gases respectively is ..... .

a. 20 cm$^3$ , 40 cm$^3$  b. 40 cm$^3$ , 20 cm$^3$  c. 30 cm$^3$ , 30 cm$^3$

6. The covalent bond in a molecule of water is (are) ..... bond(s).

a. one double  b. one triple  c. two single

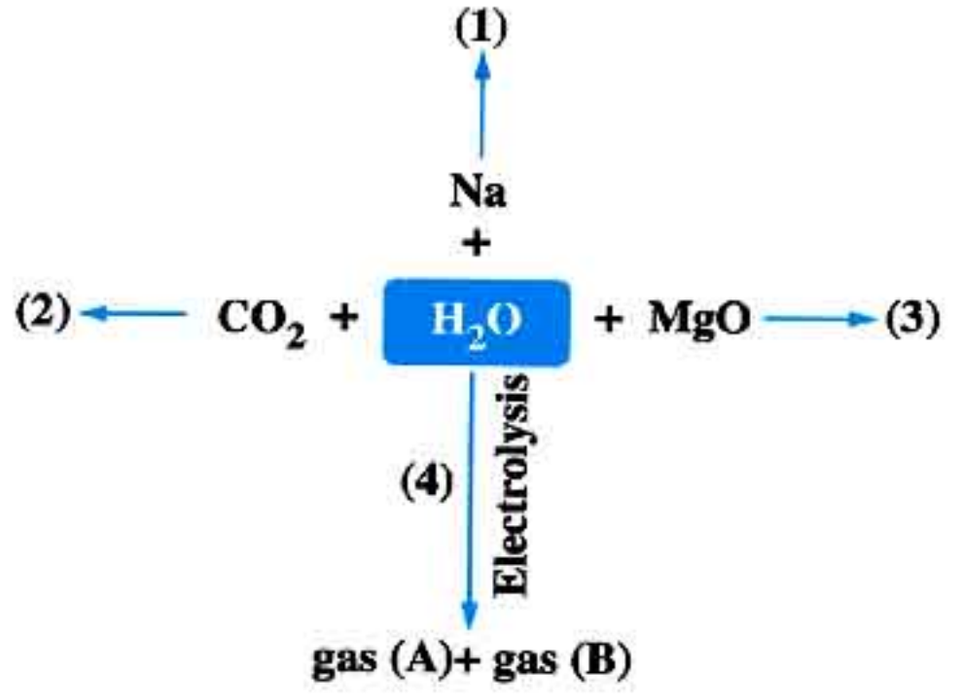
## 2. In the opposite figure :

a. What is the type of solution formed from the reactions (2 , 3) ?

b. What is the effect of the solution formed from reaction number (1) on the litmus dye ? (Give a reason).

c. (1) Mention the name of the gas (A) and gas (B) which are produced from the electrolysis of water.

(2) What is the device used in the process number (4) ?

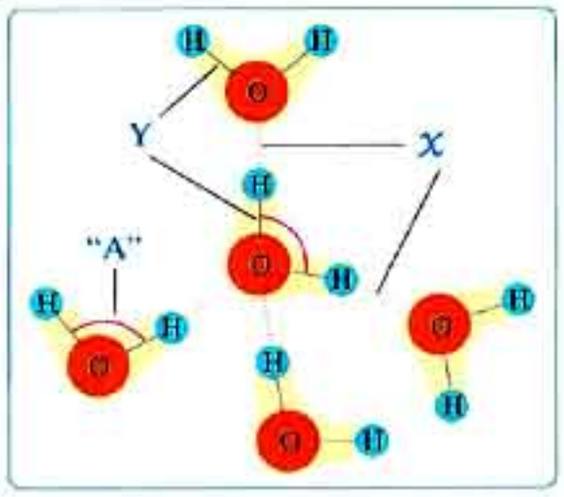





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Timss Questions

**3. From the opposite figure, answer the following :**




1. Mention the kind of X and Y bonds.
2. Which one is stronger ?
3. Complete :

(a) The figure represents the structure of ..... molecule.

(b) The angle "A" equals .....



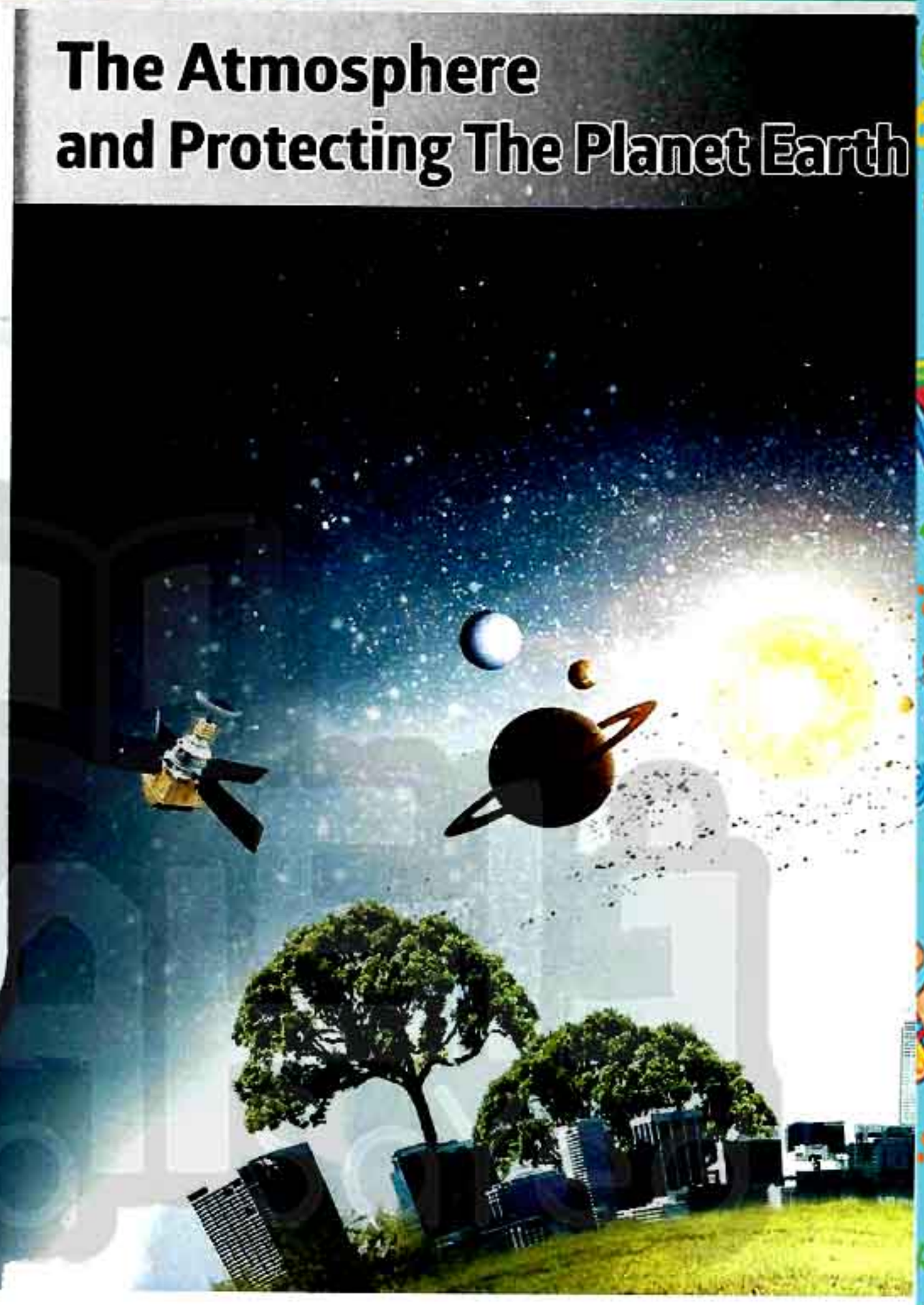



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UNIT

2

# The Atmosphere and Protecting The Planet Earth



## Lessons of the unit :

1. The Atmospheric Layers.
2. Erosion of Ozone Layer and Global Warming.

## Unit Objectives :

**By the end of this unit, students will be able to :**

- Know the concept of atmospheric pressure and layers of atmospheric envelope.
- Interpret the change of atmospheric pressure with changing height above sea level.
- Appreciate the importance of instruments that measure atmospheric pressure.
- Describe the characteristics of atmospheric layers.
- Compare between the characteristics of atmospheric layers.
- Conclude the importance of each layer of atmosphere.
- Recognize the importance of studying each layer of the atmosphere.

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- Appreciate the role of scientists to reach devices measuring atmospheric pressure.
- Know the composition of ozone gas.
- Conclude the steps of ozone formation.
- Aware of the importance of ozone layer for the human and living organisms.
- Describe the global warming phenomenon and greenhouse effect.
- Identify greenhouse gases.
- Explain the increase in the temperature of atmospheric envelope of Earth.
- Determine the negative effects resulted from the rising temperature of the Earth's atmosphere.
- Appreciate greatness of God in providing the atmosphere and air for living organisms.

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LESSON 1

# The Atmospheric Layers



**What** is the importance of studying the atmospheric layers ?

***We know that air is a gaseous matter which has a mass, a weight, a volume and an atmospheric pressure.***

**In this lesson we will study :**

- *Atmospheric pressure.*
- *Atmospheric layers.*

## Atmospheric pressure

- To understand the meaning of atmospheric pressure, you should know the atmospheric envelope.

## Atmospheric envelope :

- The Earth is surrounded by a gaseous envelope known as **atmospheric air** or **atmospheric envelope**.

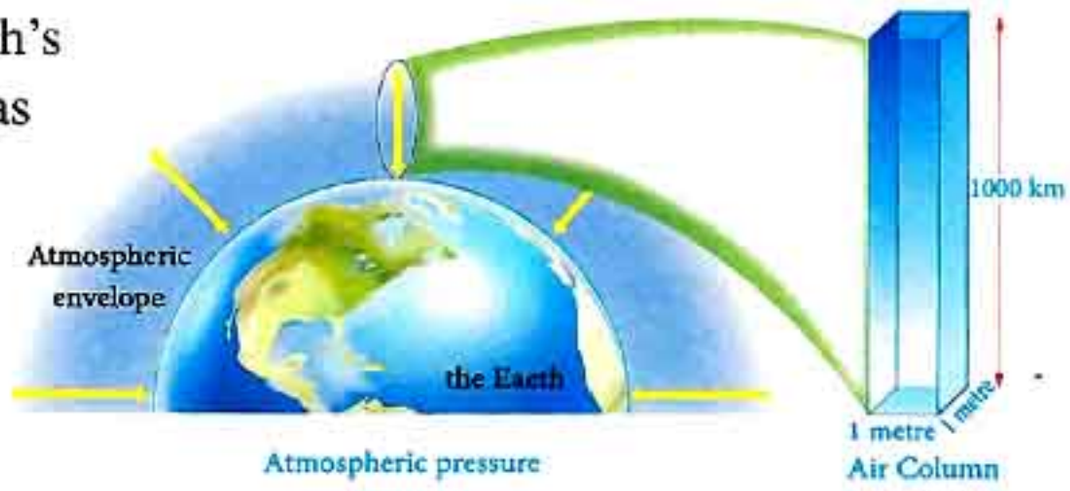
### Atmospheric envelope of the Earth:

It is a gaseous envelope rotating with the Earth around its axis and it extends for about 1000 km above sea level.

- The weight of this envelope affects the Earth's surface and objects on it by a force known as atmospheric pressure.

### Atmospheric pressure:

It is the weight of air column of an atmospheric height on a unit area ($1m^2$).



Atmospheric pressure



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Lesson One

## Atmospheric pressure:

It is the weight of air column of an atmospheric height on a unit area ($1m^2$).

The atmospheric pressure is measured by a unit called a bar or a millibar.

**1 bar (b) = 1000 millibar (mb)**

## Normal atmospheric pressure:

It is the atmospheric pressure at sea level and it equals 1013.25 mb.

### Enrichment information

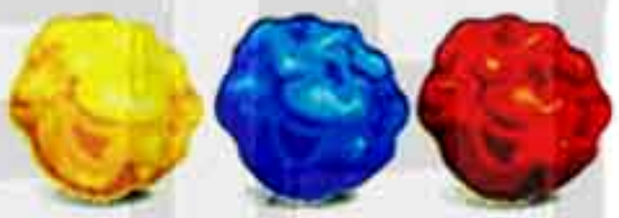
*The internal pressure in the human body is equivalent to the external atmospheric pressure.*

## The change of atmospheric pressure with the change in height above sea level

**Activity** **To show how atmospheric pressure changes by changing the height above sea level :**

### Materials :

- 4 large books.
- 6 plastic sheets.
- 3 pieces of clay of different colours.



### Steps :

1. Form 3 similar spheres of clay of different colours.
2. Put the clay spheres between plastic sheets and books (as shown in the figure).



### Observations :

- The shapes of clay spheres change by the effect of the weight of the books on them.
- The change in the shape of lower clay sphere is the maximum due to increasing the pressure on it by the effect of the weight of the books, while the change in the shape of higher one is the minimum.

### Conclusion :

The change in the shape of clay spheres increases by increasing the number of books (or height) due to the increase in their weight (or pressure).

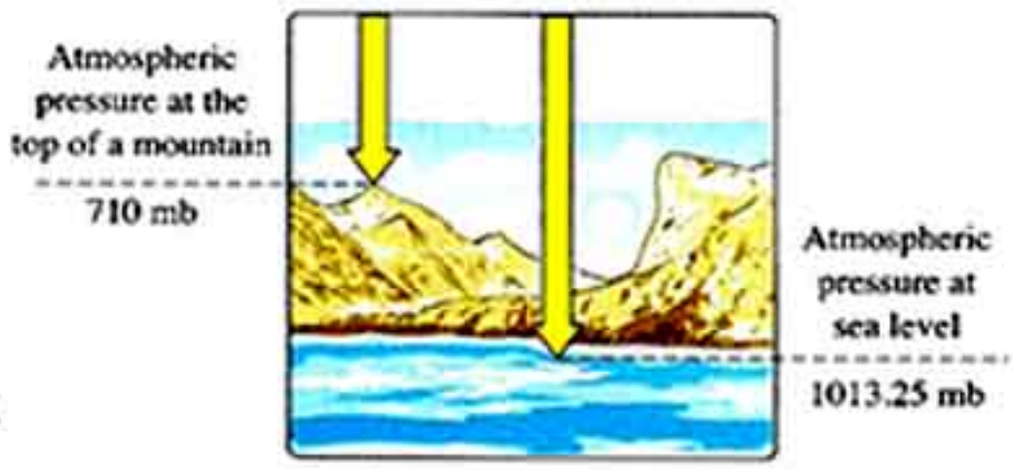


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Unit 2

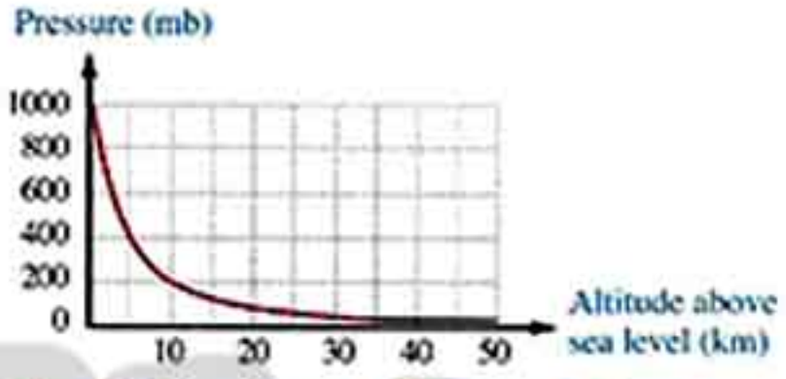
## Similarly :

- The atmospheric pressure increases on going under sea level GR. **Due to increasing the length of air column and thus its weight increases.**
- The atmospheric pressure decreases on going above sea level GR. **Due to decreasing the length of air column and thus its weight decreases.**




The atmospheric pressure decreases on going above sea level

GR. ***The atmospheric pressure differs from an area to another on the Earth's surface.***
Due to the difference in the length of air column from an area to another on the Earth's surface.




The relation between the altitude above sea level and the atmospheric pressure
**(Inverse relationship)**

## Notes

- **50% of the mass of atmospheric air** is present in the area between sea level and **3 km height.**
- **90% of the mass of atmospheric air** is present up to **16 km height** above sea level.

## What happens to ... ?

**The density of air on going above sea level.**

➲ **The density of air decreases.**



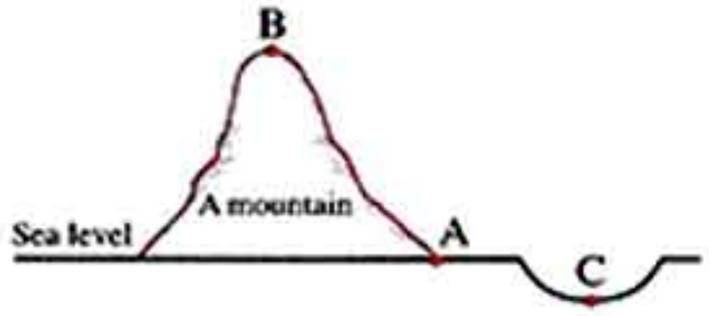

Density of air at the top of a mountain is less than its density at the foot of the mountain

## Exercise 1

***From the opposite figure, at which points :***

1. Atmospheric pressure is the maximum.
2. Air density is the minimum.

***"Give an explanation at each case"***




### Answer

1. At point (C), because the atmospheric pressure increases on going under sea level.
2. At point (B), because density of air decreases on going above sea level.



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## Exercise 2

***Choose the values of atmospheric pressure that suit the elevations above sea level.***

| Elevation above sea level (km) | 3 | 6 | 9 | 12 |
|---|---|---|---|---|
| Atmospheric pressure (mb) | 203 | 731 | 323 | 503 |

**Answer**

| Elevation above sea level (km) | 3 | 6 | 9 | 12 |
|---|---|---|---|---|
| Atmospheric pressure (mb) | 731 | 503 | 323 | 203 |

## The instruments of measuring the atmospheric pressure

- The atmospheric pressure is measured by instruments called **barometers** which are shown in the following table :

| Instrument | Figure | Importance |
|---|---|---|
| Aneroid |  | It is used to determine the possible day weather based on the atmospheric pressure. |
| Altimeter |  | It is used in aeroplanes to measure the elevation of navigation based on the atmospheric pressure. |

**Enrichment information**

*The greatest atmospheric pressure could be recorded on the surface of the Earth in January, 1968 in Siyberia and it was 1080 mb, whereas the lowest atmospheric pressure was in the centre of the tropical hurricane "Typhoon" in 1979 and it was 870 mb.*

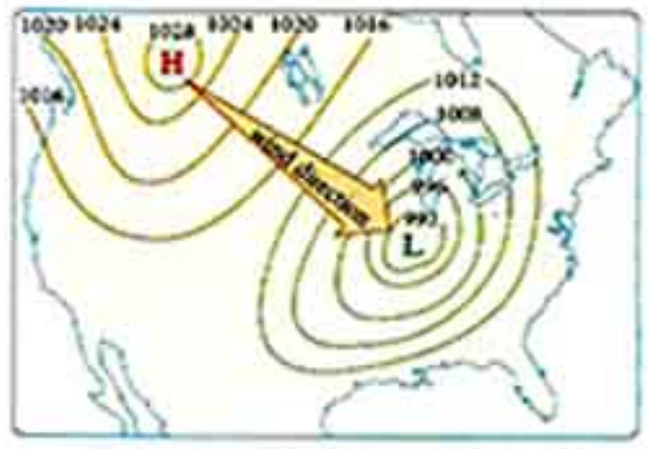


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Unit 2

## Atmospheric pressure maps

In atmospheric pressure maps, points of **equal pressure** are joined by curved lines known as **Isobar**.



Atmospheric pressure map

**Isobar :**

It is the curved lines that join the points of equal pressure in atmospheric pressure maps.

- The centre of **high** atmospheric pressure areas is represented by "H".
- The centre of **low** atmospheric pressure areas is represented by "L".
- The wind moves from the areas of **high** atmospheric pressure to the areas of **low** atmospheric pressure.

GR.

***Wind moves from an area to another on the Earth's surface.***

Due to the difference in atmospheric pressure from an area to another on the Earth's surface, where the wind moves from the areas of high atmospheric pressure to the areas of low atmospheric pressure.

## Layers of the atmospheric envelope

**The atmospheric envelope consists of four layers above sea level, which are classified according to :**

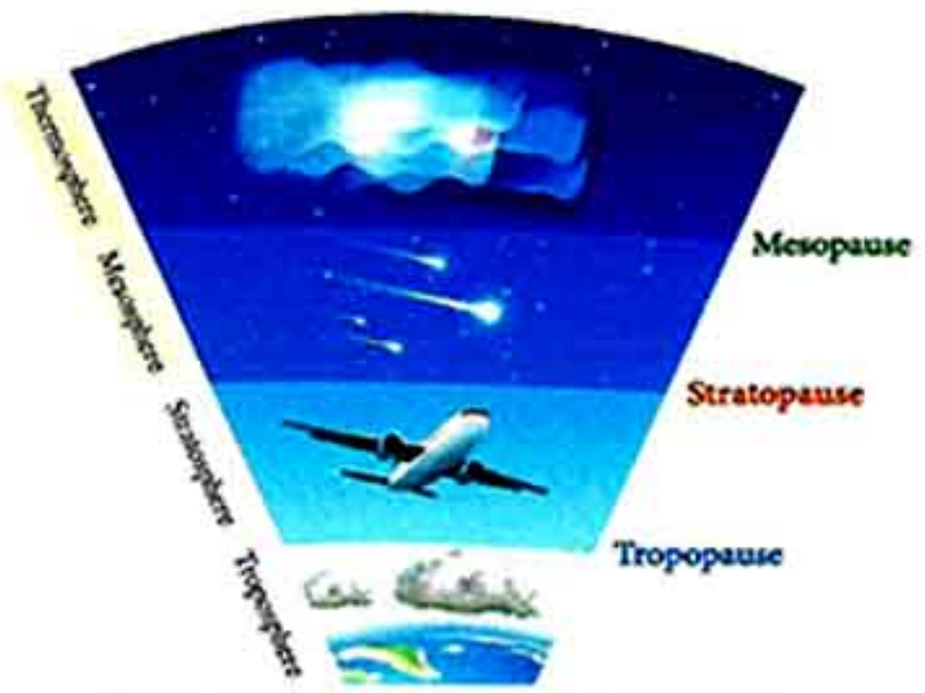
- *The change in atmospheric pressure.*
- *The change in temperature.*

### Layers of the atmospheric envelope

1 Troposphere — 2 Stratosphere — 3 Mesosphere — 4 Thermosphere

**There is a region between each two successive layers. In these regions, temperature remains constant.**

1. **Tropopause** is the region between troposphere and stratosphere.
2. **Stratopause** is the region between stratosphere and mesosphere.
3. **Mesopause** is the region between mesosphere and thermosphere.



Layers of the atmospheric envelope



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## 1 Troposphere

It means the **disturbed layer** GR.

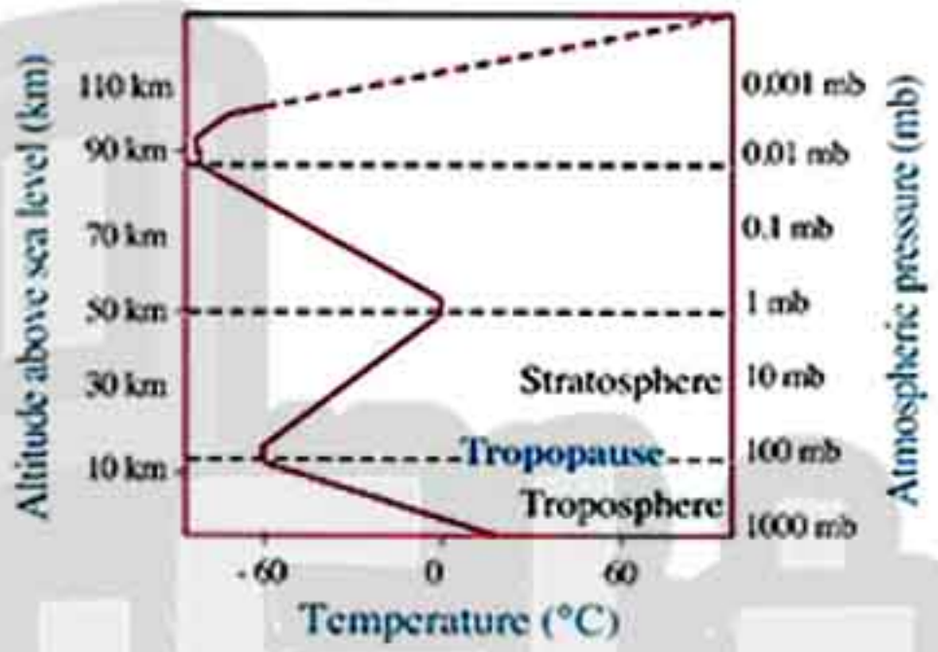
**Because all atmospheric turbulences (weather changes) take place in it.**

### Location

It is the first layer of atmospheric envelope.

### Characteristics and importance of troposphere layer :

**Study the opposite figure to know the properties of troposphere layer :**




### Thickness

It extends for about **13 km** above sea level to the tropopause (**i.e. the thickness of troposphere layer is 13 km**).

**▸ Enrichment information**

*Troposphere thickness is about 8 km above the two poles and 18 km at the equator so, average troposphere thickness* $= \frac{8 + 18}{2} = 13$ *km.*

### Pressure

The atmospheric pressure in this layer **decreases** as we go up until it becomes 100 mb at its top 100 mb = 0.1 bar (0.1 of the normal atmospheric pressure at sea level).

### Importance

- All weather phenomena are present in troposphere layer GR.
  **Because it contains about *75%* of the mass of the atmospheric air.**
- Troposphere layer organizes the Earth's temperature GR.
  **Because it contains *99%* of atmospheric water vapour.**



Clouds and winds

**Note**

Weather phenomena such as rains, wind, clouds, ..... etc. take place in troposphere layer that form the weather conditions and consequently up the climate, that affect the activities of living organisms.

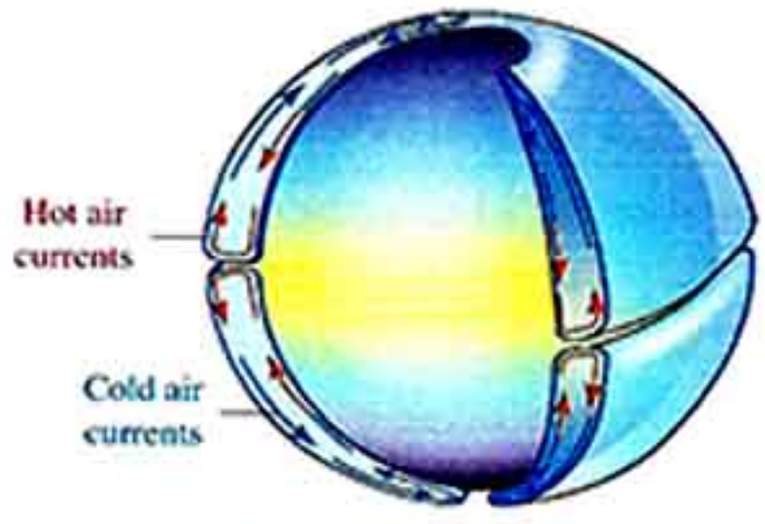


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Unit 2

## Air movement

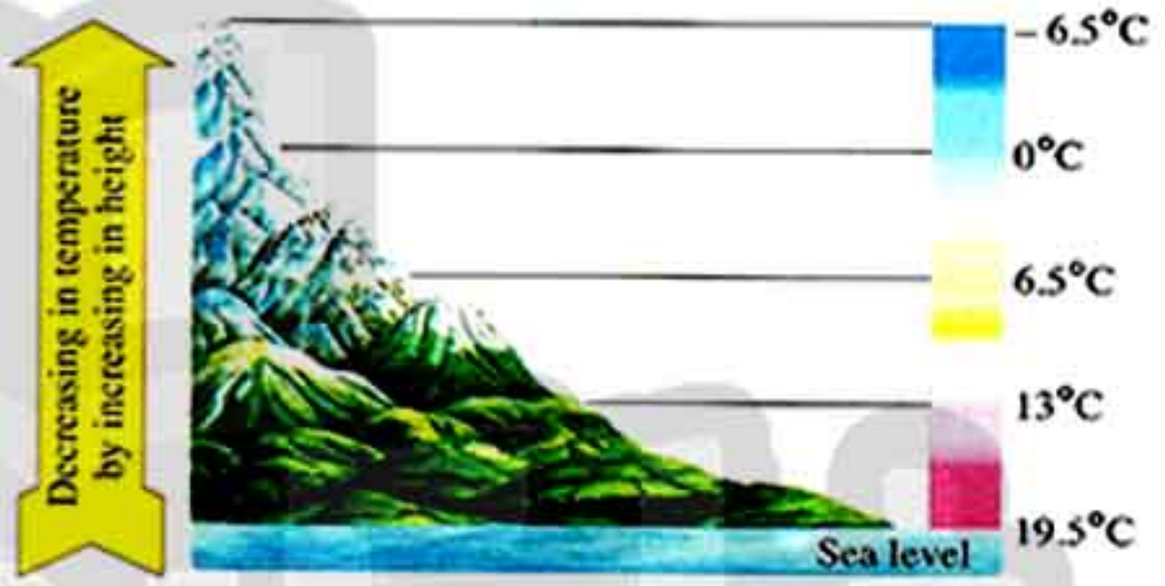
The air movement in this layer is **vertical** GR. **Because the hot air currents (of less density) move upwards, while cold air currents (of high density) move downwards.**




The movement of air currents

## Temperature

**The temperature of this layer decreases at a rate (6.5°C) for each (1 km) height until it reaches the lowest value of about (– 60°C) at tropopause.**

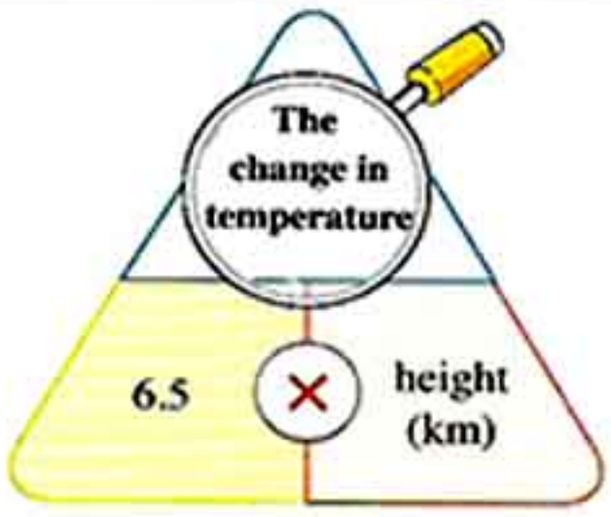



Decreasing in temperature by a rate 6.5°C for each 1 km height.

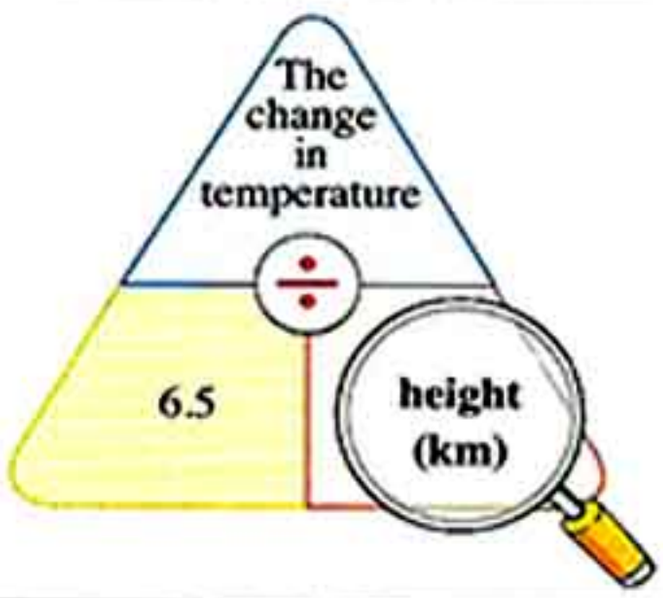
**We can calculate the amount of change in the temperature in troposphere layer using the following relation :**

**The amount of change in temperature (decrease or increase) = the height above sea level (km) × 6.5**

**For determination the change in temperature**




**For determination the height above sea level (km)**






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Lesson One

**We can calculate the temperature at the top of a mountain or at its foot from the following relations :**

**The temperature at the top of a mountain = the temperature at its foot – the amount of decrease in temperature**

**The temperature at the foot of a mountain = the temperature at its top + the amount of increase in temperature**

## Example 1

***If the temperature at the foot of Everest mountain is 20.6°C, find the temperature at its top of height 8862 m above the Earth's surface.***

### Solution

- Height in kilometres = 8862 ÷ 1000 = 8.862 km
- The amount of decrease in temp. = the height above sea level (km) × 6.5
  = 8.862 × 6.5 = 57.6°C
- Temperature at the top = temp. at the foot – the amount of decrease in temp.
  = 20.6 – 57.6 = – 37°C

## Example 2

***In the opposite figure, calculate :***

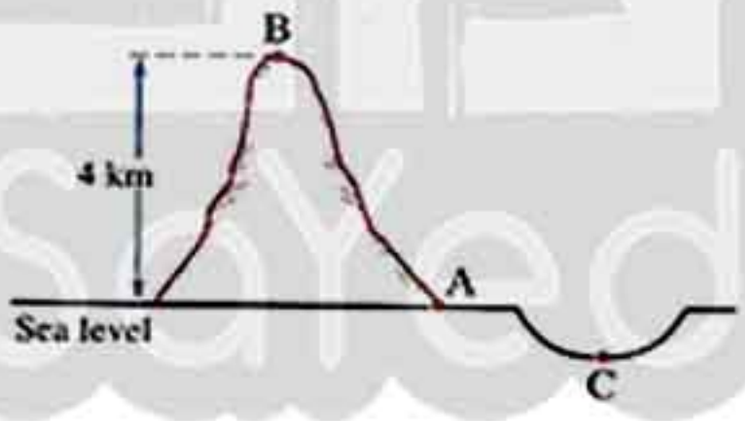
***(1) The temperature at point (A)***

***(2) The vertical distance between point (B) and point (C).***

***If you know that :***

***- The temperature at point (B) = – 5°C***

***- The temperature at point (C) = 27.5°C***




### Solution

**1.** The amount of increase in temp. (B : A) = the height above sea level (km) × 6.5
= 4 × 6.5 = 26°C

The temp. at point (A) = the temp. at point (B) + the amount of increase in temp.
= (– 5) + 26 = 21°C

**2.** ∵ The amount of change in temp. (C : B) = the temp. at point (C) – the temp. at point (B)
= 27.5 – (– 5) = 32.5°C

∴ The vertical distance between point (B) and point (C)

$$= \frac{\text{the amount of change in temp.}}{6.5} = \frac{32.5}{6.5} = 5 \text{ km}$$

**TRY** to answer worksheet 12 in the Notebook



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Unit 2

## 2 Stratosphere

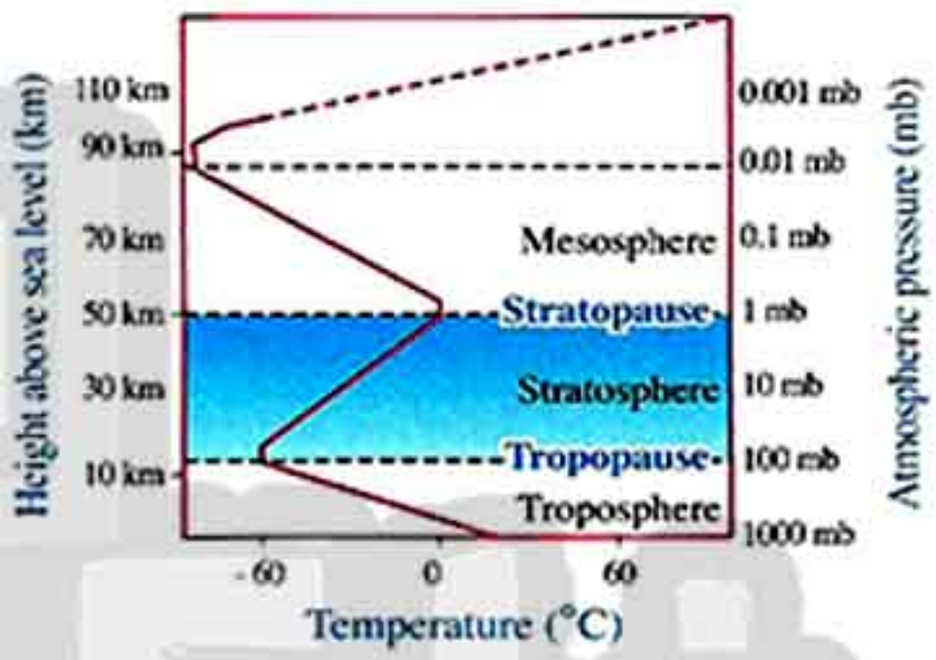
It is called **the ozonic atmospheric envelope.**

### Location

It is the second layer of atmospheric envelope.

### Characteristics and importance of stratosphere layer :

**Study the opposite figure to know the properties of stratosphere layer :**




### Thickness

It extends from tropopause (at a height of **13 km** above sea level) to stratopause (at a height of **50 km** above sea level) with a thickness of **37 kilometres.**

### Pressure

The atmospheric pressure in this layer **decreases** as we go up until it becomes 1 mb at its top 1 mb = 0.001 bar (0.001 of the normal atmospheric pressure at the sea level).

### Importance

It contains most of ozone gas ($O_3$), which extends from 20 km to 40 km height above sea level so, it is called **the ozonic atmospheric envelope.**

### Air movement

The lower part of such layer does not contain clouds or weather disturbances and the air movement is **horizontal,** so pilots prefer to fly their planes in this layer.



Flying in stratosphere

### Temperature

At the lower part, the temperature is constant and measure **(– 60°C)**, then **increases** gradually until it reaches **(0°C)** at the top of the layer

**This is due to the absorption of ultraviolet rays (emitted from the Sun) by ozone layer which is present at the upper part of this layer.**



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## 3 Mesosphere

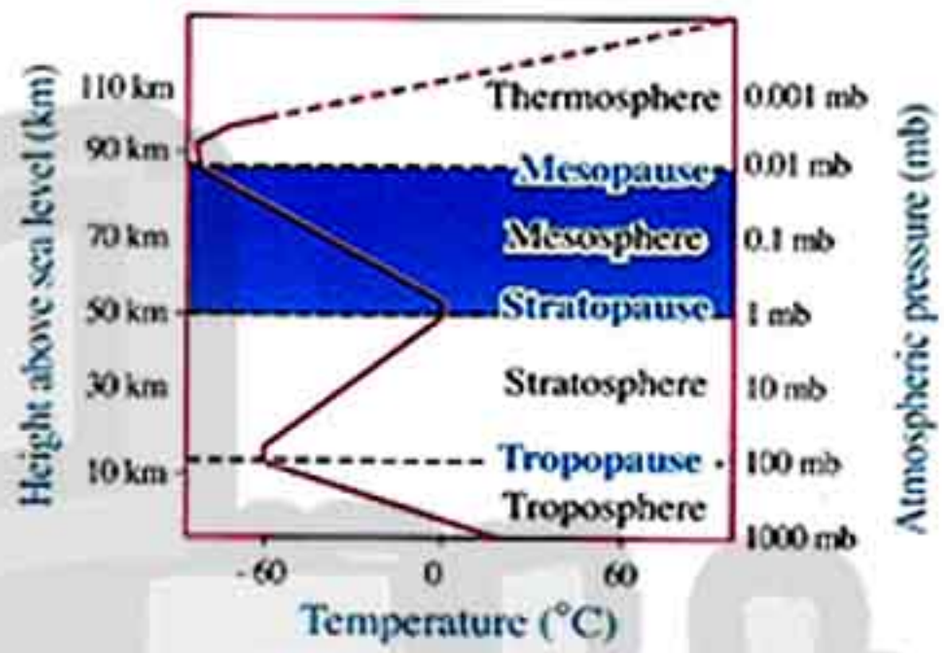
It is the middle layer, so it called mesosphere (**meso** means **middle**).

### Location

It is the third layer of atmospheric envelope.

### Characteristics and importance of mesosphere layer :

**Study the opposite figure to know the properties of mesosphere layer :**




### Thickness

It extends from stratopause (at a height of **50 km** above sea level) to mesopause (at a height of **85 km** above sea level) with a thickness of **35 kilometres.**

### Pressure

The atmospheric pressure in this layer **decreases** as we go up, until it becomes **0.01 mb** at its top.

### Importance

It protects the planet Earth from celestial rocky masses that enter the atmospheric envelope of Earth, where some of them burn completely as a result of their friction with air molecules forming luminous meteors.



Formation of meteors in mesosphere

GR. ***Mesosphere layer is much vacuumed (highly rarefied).***
Because it contains limited quantities of helium and hydrogen gases only.

### Temperature

Mesosphere is considered the coldest layer GR.
**Because the temperature in this layer decreases at a high rate as we go up until it reaches (– 90°C) at its top.**

▸ **Enrichment information**

***Although meteors are burnt in mesosphere layer, spaceships can't be burnt during passing in it because their conical fronts disperse the heat and their tails are made of an insulated material.***



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Unit 2

## 4 Thermosphere

**It is called the thermal layer** GR.

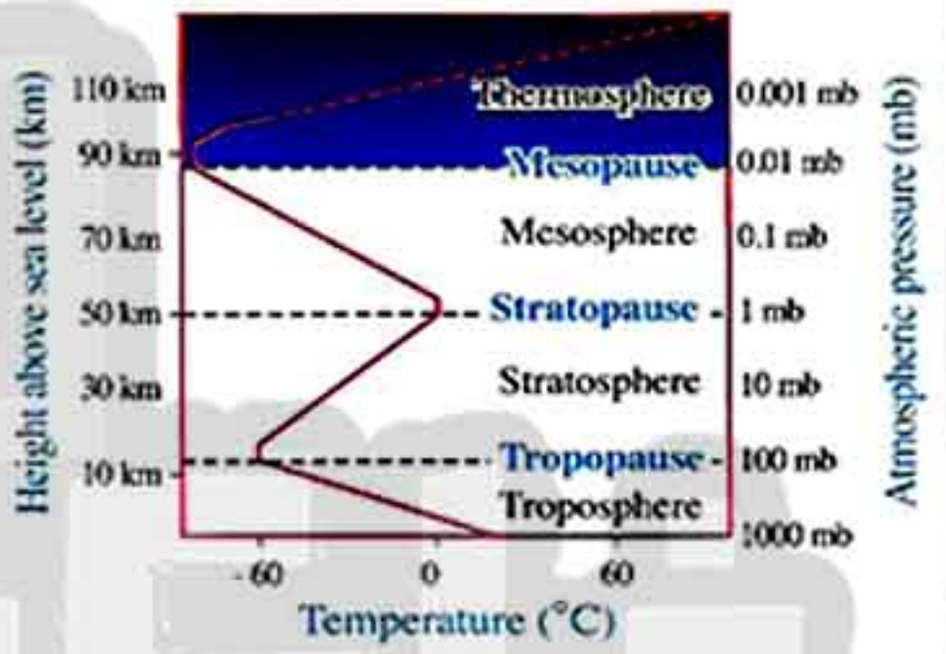
**Because it is the hottest layer of atmospheric envelope.**

### Location

It is the fourth layer of atmospheric envelope.

### Characteristics and importance of thermosphere layer :

**Study the opposite figure to know the properties of thermosphere layer :**




### Thickness

It extends from mesopause (at a height of **85 km** above sea level) to a height of **675 km** above sea level with a thickness of **590 kilometres.**

### Temperature

The temperature of this layer **increases** at a high rate as we go up until it reaches **(1200°C)** at its top so, it is called the thermal layer.

GR. | ***The upper part of thermosphere layer is called ionosphere.***

Because it contains charged ions.

## Ionosphere layer

### Ionosphere layer:

It is a layer that contains charged ions and it exists in the upper part of thermosphere and extends up to 700 km above sea level.

### Importance

It is very important in wireless communications and broadcasting GR.

**Because it reflects radio waves transmitted by radio stations and communication centres.**



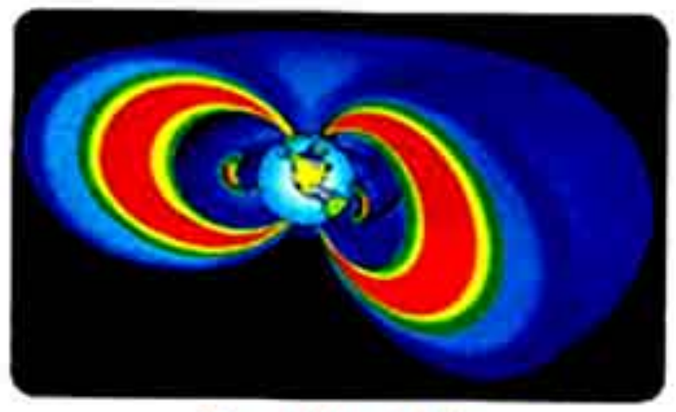

Reflection of radio waves from ionosphere



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## Van-Allen belts

Ionosphere is surrounded by two magnetic belts known as **Van-Allen** belts which is related to the scientist Van-Allen who discovered them.



Van-Allen belts

### Van-Allen belts:

They are two magnetic belts surrounding ionosphere.

**Importance**

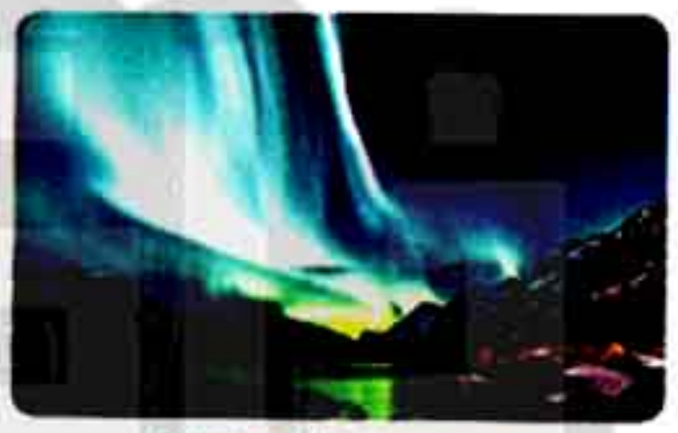
These belts play an important role in scattering of harmful charged cosmic radiations away from the Earth which causes the occurrence of **Aurora** phenomenon.



Scattering of harmful charged cosmic radiations away from the Earth

### Aurora phenomenon:

It is a phenomenon that appears as brightly coloured light curtains seen at both poles (the north and south poles) of the Earth.



Aurora phenomenon

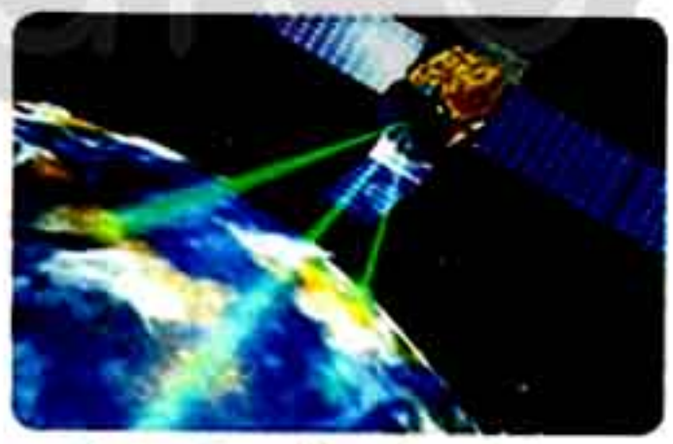
## Exosphere layer

### Exosphere:

It is a region in which the atmospheric envelope is inserted in outer space.

**Importance**

Satellites float in exosphere [around the Earth] are used to transmit weather condition information and TV programs.



Role of satellites in wireless communications

**▸ Enrichment information**

*The Egyptian satellite (Nile sat) transmits a number of different educational channels which you can watch through the digital space channels.*

TRY to answer worksheet 13 in the Notebook



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# Remember



### Atmospheric envelope :

It is a gaseous envelope surrounding the Earth that rotates with it around its axis and it extends for about 1000 km above sea level.

### Atmospheric pressure :

It is the weight of air column of an atmospheric height on a unit area ($1m^2$).

### Normal atmospheric pressure :

It is the atmospheric pressure at sea level and it equals 1013.15 mb.

- 50 % of the mass of atmospheric air is present in the area between sea level and 3 km height.
- 90 % of the mass of atmospheric air is present up to 16 km height above sea level.

### The instruments of measuring the atmospheric pressure :

- The atmospheric pressure is measured by instruments called barometers.
- Among the most famous types of barometers are aneroid and altimeter.
- **Aneroid** is used to determine the possible day weather.
- **Altimeter** is used in aeroplanes to measure the elevation of navigation.

### Isobar :

It is the curved lines that join the points of equal pressure in atmospheric pressure maps.

- Wind moves from the areas of high atmospheric pressure to the areas of low atmospheric pressure.

### Atmospheric layers :

- We can classify the atmospheric envelope into four layers according to :
  - The change in atmospheric pressure.
  - The change in temperature.



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| | | | |
|---|---|---|---|
| 675 Km | Thermosphere (590 Km) | - The hottest layer.<br>- Its upper part contains charged ions and extends up to 700 km above sea level, therefore this part is known as ionosphere.<br>**Ionosphere :**<br>- It is very important in wireless communications and broadcasting.<br>  <br>- It is surrounded by two magnetic belts known as **Van-Allen** belts. | **Temperature:** at its top (1200°C) |
| 85 Km | Mesosphere (35 Km) | - The coldest layer.<br>- It contains limited quantities of helium and hydrogen gases only, so it is much vacuumed (highly rarefied).<br>  <br>- It protects the planet Earth from celestial rocky masses that enter the atmospheric envelope of Earth. | **Temperature:** at its top (– 90°C)<br>**Atmospheric pressure:** (0.01mb) |
| 50 Km | Stratosphere (37 Km) | - It is called the ozonic atmospheric envelope.<br>- It contains most of ozone gas which extends from 20 : 40 km above sea level.<br>  <br>- Pilots prefer to fly their planes in this layer.<br>- Air movement in this layer is horizontal. | **Temperature:** at its top (0°C)<br>**Atmospheric pressure:** (0.001 bar) |
| 13 Km | Troposphere (13 km) | - It means the disturbed layer.<br>- It contains :<br>* About 75% of the mass of the atmospheric air.<br>* 99% of atmospheric water vapour.<br>  <br>- Air movement in this layer is vertical. | **Temperature:** at its top (– 60°C)<br>**Atmospheric pressure:** (0.1 bar) |
| Sea level | | | |

### Van-Allen belts :

They are two magnetic belts surrounding ionosphere and play an important role in scattering harmful charged cosmic radiations.



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# QUESTIONS
## on lesson one



Questions signed by ▯ have been taken from the school book.

## 1. Choose the correct answer :

1. The height of atmospheric envelope is about ..... above sea level.
   a. 1000 km  b. 1000 m  c. 1000 mb  d. 13 km
2. Atmospheric pressure is the ..... of air column of an atmospheric height on a unit area.
   a. mass  b. volume  c. weight  d. density
3. The measuring unit(s) of atmospheric pressure is (are) .....
   a. bar.  b. newton.  c. millimetre.  d. both (a) and (c).
4. A device that is used in measuring the atmospheric pressure is .....
   a. barometer.  b. voltmeter.  c. ammeter.  d. (b) and (c).
5. ▯ The normal atmospheric pressure equals ..... mb at sea level.
   a. 76  b. 1013.25  c. 1.013  d. 760
6. As the density of air increases, the atmospheric pressure .....
   a. increases.  b. decreases.  c. doesn't change.  d. (a) or (b).
7. ..... is an instrument used by pilots in aeroplanes to measure their elevation above sea level based on atmospheric pressure.
   a. Altimeter  b. Barograph  c. Aneroid  d. Metallic barometer
8. A decrease in temperature at any height in troposphere is given by .....
   a. height in metres × 6.5  b. height in km + 6.5
   c. height in km × 6.5  d. height in km ÷ 6.5
9. Temperature decreases by ..... at 2 km above sea level.
   a. 6.5°C  b. 13°C  c. 5.6°C  d. 9.75°C
10. All the atmospheric phenomena on the Earth like rains, winds and clouds take place in ..... layer.
    a. mesosphere  b. stratosphere  c. thermosphere  d. troposphere
11. Water vapour in troposphere ..... the temperature on the Earth.
    a. organizes  b. decreases  c. increases  d. has no effect on
12. ..... is the second layer of atmospheric envelope.
    a. Thermosphere  b. Stratosphere  c. Troposphere  d. Mesosphere
13. ▯ ..... is the region between stratosphere and mesosphere.
    a. Thermopause  b. Mesopause  c. Stratopause  d. Tropopause



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14. Ozone layer is found in ..... layer.
a. troposphere b. stratosphere c. mesosphere d. thermosphere

15. The air moves ..... in the stratosphere layer.
a. horizontally b. vertically
c. inclined d. no correct answer

16. Pilots prefer to fly their planes in the lower part of stratosphere because .....
a. no clouds exist. b. there are no weather disturbances.
c. air moves horizontally. d. all the previous answers.

17. The coldest atmospheric layer in the atmospheric envelope is .....
a. troposphere. b. stratosphere. c. mesosphere. d. thermosphere.

18. The thickness of mesosphere layer is ..... km.
a. 1000 b. 13 c. 37 d. 35

19. The temperature at the top of mesosphere layer reaches .....
a. 76°C b. – 90°C c. – 60°C d. 1200°C

20. The ..... layer is much vacuumed layer.
a. troposphere b. stratosphere c. mesosphere d. thermosphere

21. 🕮 Luminous meteors are formed in ..... layer.
a. ionosphere b. stratosphere c. mesosphere d. exosphere

22. The hottest atmospheric layer in atmospheric envelope is .....
a. troposphere. b. stratosphere. c. thermosphere. d. mesosphere.

23. Ionosphere layer is surrounded by two ..... belts.
a. electric b. ionic c. magnetic d. thermal

24. Ionosphere layer is located in the upper part of ..... layer.
a. stratosphere b. troposphere c. mesosphere d. thermosphere

25. The charged cosmic radiations are dispersed in the ..... layer.
a. troposphere b. stratosphere c. mesosphere d. ionosphere

## 2. Choose from column (B) what suits it in column (A) :

(1)

| (A) | (B) |
|---|---|
| 1. Barometer | a. The coldest layer in atmospheric envelope. |
| 2. Altimeter | b. The layer that is suitable for aeroplanes. |
| 3. Troposphere | c. An instrument used to measure atmospheric pressure. |
| 4. Mesosphere | d. The layer that contains all weather conditions. |
| 5. Stratosphere | e. An instrument used to determine the altitudes of navigation. |
| 6. Thermosphere | f. The hottest layer in atmospheric envelope. |


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(2)

| (A) | (B) |
|---|---|
| 1. Mesopause | a. protects man's life from ultraviolet rays. |
| 2. Tropopause | b. protect man's life from cosmic radiations. |
| 3. Ozone layer | c. is the region between mesosphere and thermosphere. |
| 4. Van-Allen belts | d. is the region between stratosphere and mesosphere. |
| 5. Ionosphere | e. is the region between troposphere and stratosphere. |
| 6. Stratopause | f. is a layer used in wireless communications. |

**3. Put (✓) in front of correct statements and (✗) in front of incorrect ones, then correct them :**

1. Atmospheric envelope rotates with the Earth around its axis. ( )
2. Atmospheric pressure is the mass of air column above unit area. ( )
3. 50 % of the mass of the atmospheric envelope is present in the area between the sea level and 3 km elevation. ( )
4. Atmospheric pressure decreases by increasing the altitude above sea level. ( )
5. The density of air increases as we go up. ( )
6. Altimeter is an instrument used to determine the elevation of aeroplanes above sea level. ( )
7. Wind moves from regions of high atmospheric pressure to that of low atmospheric pressure. ( )
8. Troposphere is the first layer of atmospheric envelope. ( )
9. Stratopause is the region between stratosphere and troposphere. ( )
10. All atmospheric phenomena like rains, winds and clouds take place in ionosphere layer. ( )
11. The thickness of troposphere layer is 37 kilometres. ( )
12. Mesosphere layer contains 99% of atmospheric water vapour which organizes the Earth's temperature. ( )
13. The atmospheric pressure in stratosphere layer increases as we go up until it becomes 0.001 bar. ( )
14. Pilots prefer to fly their aeroplanes in the upper part of mesosphere. ( )
15. Meteors are formed in mesosphere layer due to their friction with air molecules. ( )
16. Mesosphere is the coldest layer in the atmospheric envelope. ( )
17. The temperature of the fourth layer increases at a high rate as we go up until it reaches 1200°C at its top. ( )
18. Ozone layer is found in thermosphere layer. ( )
19. Stratosphere is the third layer in atmospheric envelope. ( )
20. Aurora phenomenon is considered as coloured brightly light curtains seen at North and South Poles of the Earth. ( )



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21. The atmospheric envelope is inserted in the outer space in a region known as ionosphere. ( )
22. The satellites revolve around the Earth in a region called the exosphere. ( )
23. The ionosphere is surrounded by two Van-Allen's belts, which are responsible for scattering the harmful cosmic rays away from Earth. ( )

## 4. Write the scientific term of each of the following :

1. The gaseous envelope which surrounds the Earth and is rotating with it around its axis.
2. The weight of air column of an atmosphere height above a unit area.
3. The measuring unit of atmospheric pressure.
4. The atmospheric pressure at sea level.
5. A device used to measure the atmospheric pressure.
6. A barometer used to determine the possible day weather.
7. A barometer used by pilots in aeroplanes to measure their elevations above sea level.
8. The curved lines that join the points of equal pressure in atmospheric pressure maps.
9. The region between troposphere and stratosphere layers.
10. 📖 The region between stratosphere and mesosphere and at which the temperature remains constant.
11. The region between mesosphere and thermosphere.
12. • The first layer of atmospheric envelope.
    • An atmospheric layer, in which air currents move vertically.
13. • The second layer of atmospheric envelope.
    • The ozonic atmospheric envelope.
14. An atmospheric layer in which air moves horizontally.
15. A layer, that protects man's life from harmful radiations.
16. • The coldest atmospheric layer.
    • The third layer of atmospheric envelope.
17. • The fourth layer of atmospheric envelope.
    • The hottest atmospheric layer.
18. 📖 A charged layer reflects radio waves.
19. The atmospheric layer, at which pilots prefer to fly.
20. The atmospheric layer, which contains limited quantities of hydrogen and helium gases only.
21. Two magnetic belts that help in scattering of harmful cosmic radiations away from the Earth.
22. • The phenomenon that appears due to scattering of harmful charged radiations by Van-Allen belts.
    • A phenomenon that appears as brightly coloured light curtains seen at the both poles of the Earth.



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23. • The region, in which the atmospheric envelope is inserted in outer space.
    • The region in which satellites orbit around the Earth planet.

## 5. Complete the following statements :

1. The Earth is surrounded by ..... envelope known as .....
2. The atmospheric air causes ..... on the Earth's surface known as .....
3. Bar is the unit used to measure .....
4. 1 bar = ..... millibar.
5. Normal atmospheric pressure equals ..... mb at sea level.
6. ..... is a type of barometers used to determine the possible day weather, while ..... is the instrument used to measure the altitude of aeroplanes above sea level.
7. The atmospheric pressure ..... by increasing the height of air column.
8. As we go to the top of a mountain, the atmospheric pressure ..... because the height of air column .....
9. 50% of the mass of atmospheric air is present in the area between sea level and ..... km. height, but ..... % of its mass is present up to 16 km. height.
10. The density of air on the top of a mountain is ..... than the density of air at the sea level.
11. Wind moves from the areas of ..... atmospheric pressure to that of ..... atmospheric pressure.
12. The atmospheric envelope consists of ..... layers which are ..... , stratosphere, mesosphere and .....
13. The region between the first and the second layers is called ..... , while ..... is the region between the third and the fourth layers.
14. ..... is the first layer of atmospheric envelope and its thickness is about .....
15. The temperature of the troposphere decreases at a rate ..... °C for each ..... height.
16. The atmospheric pressure at the top of troposphere layer becomes ..... (0.1 bar of that at the sea level) and the temperature reaches the lowest value for about ..... °C at its top.
17. Troposphere contains about ..... % from atmospheric envelope mass and about ..... % from atmospheric water vapour.
18. Air movement in troposphere is ..... , where hot air currents move ....., while cold air currents move .....
19. ..... is the second atmospheric layer and it is also called the ..... layer.
20. The stratosphere extends with a thickness equals ..... km.
21. In the lower part of stratosphere, temperature is constant at ..... , then increases gradually until it reaches ..... at its top.
22. In the upper part of stratosphere , ..... layer is found which absorbs ..... rays emitted from the Sun.



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23. The atmospheric pressure in stratosphere layer ..... as we go up till it becomes ..... of the normal pressure.
24. Pilots prefer to fly their aeroplanes in the ..... part of stratosphere due to the absence of ..... and turbulences.
25. Stratosphere contains most of ..... gas, which is found in atmospheric envelope and it extends from ..... to ..... km above sea level.
26. ..... is the third layer in atmospheric envelope and its thickness is about .....
27. The temperature in mesosphere ..... as we go up until it reaches ..... °C at the top.
28. Mesosphere layer is highly rarefied because it contains limited quantities of ..... and ..... gases only.
29. ..... is the fourth layer in atmospheric envelope and also it is called ..... layer because it is the hottest layer in the atmospheric envelope.
30. The temperature of thermosphere layer ..... as we go up until it reaches ..... °C.
31. The upper part of thermosphere layer is called ..... and it extends up to ..... km above sea level.
32. 🕮 The highest temperature layer in the atmosphere is ..... and the lowest temperature one is .....
33. Ionosphere is surrounded by two magnetic belts known as ..... belts, which play an important role in scattering of harmful charged cosmic radiations away from the .....
34. ..... phenomenon appears as brightly coloured light curtains seen at the two ..... of the Earth.
35. 🕮 Most of weather features occur in ..... layer, whereas satellites swim through the ..... layer.

## 6. Complete the following table :

| Atmospheric layer | Order | Thickness | Temperature at its top |
|---|---|---|---|
| 1. ..... | The second | ..... | ..... |
| 2. Thermosphere | ..... | ..... | ..... |
| 3. ..... | ..... | ..... | – 90°C |
| 4. ..... | ..... | 13 km. | ..... |

## 7. Give reasons for :

1. The atmospheric pressure decreases by increasing the altitude above sea level.
2. Altimeter instrument is important for navigation.
3. Winds blowing.
4. The troposphere layer is called by this name.
5. The temperature at the top of a mountain is less than that at its foot.
6. Rains, clouds and winds are present in troposphere layer.
7. Troposphere layer regulates the Earth's temperature.



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8. The air motion in troposphere layer is vertical.
9. Hot air currents move upwards, while cold air currents move downwards.
10. The stratosphere layer is called by ozonic atmospheric envelope.
11. Temperature is high in the upper part of stratosphere layer.
12. Stratosphere layer is important for man's life.
13. • 📖 The lower part of stratosphere is suitable for flying aeroplanes.
    • Pilots prefer to fly their aeroplanes in stratosphere.
14. Mesosphere layer is called by this name.
15. Mesosphere is the coldest layer.
16. Mesosphere layer is highly rarefied.
17. Luminous Meteors are formed in mesosphere layer.
18. The last layer of atmospheric envelope is called thermal layer.
19. The upper part of thermosphere layer is called ionosphere.
20. 📖 Ionosphere is important for radio stations.
21. The harmful charged cosmic radiations are scattered away from the Earth before entering ionosphere layer.
22. Occurrence of aurora phenomenon.
23. The importance of satellites.

## 8. What is meant by .....?

1. Atmospheric envelope.
2. 📖 Atmospheric pressure.
3. Normal atmospheric pressure.
4. Isobar.
5. Tropopause.
6. Stratopause.
7. Mesopause.
8. Van-Allen belts.
9. 📖 Aurora phenomenon.
10. Exosphere.

## 9. What's the importance of .....?

1. Barometers.
2. 📖 Altimeter.
3. Aneroid.
4. Troposphere layer.
5. Isobar.
6. Ozone layer.
7. Mesosphere layer.
8. The lower part of stratosphere.
9. Ionosphere region.
10. 📖 Van-Allen belts.
11. 📖 Satellites.
12. Exosphere region.

## 10. Mention the number representing each of the following :

1. The height of atmospheric envelope.
2. The normal atmospheric pressure.
3. The percentage of water vapour in troposphere layer.
4. Temperature at the top of the stratosphere.



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5. The thickness of ozone layer.
6. The atmospheric pressure at the top of the mesosphere layer.
7. The thickness of the stratosphere layer.
8. Temperature at the top of the thermosphere.
9. The height, at which the charged ions are present in ionosphere.

## 11. What happens in the following cases ?

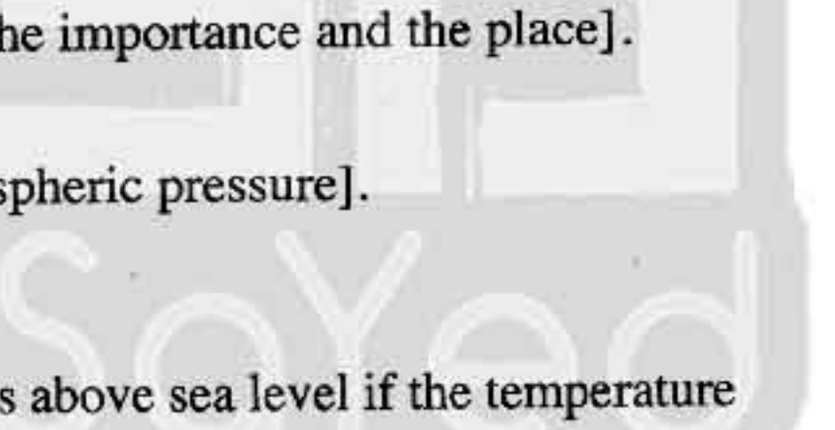
1. Diving into the depths of the sea [concerning the pressure].
2. Ascending upwards in troposphere [concerning : the temperature and the atmospheric pressure].
3. Descending downwards in stratosphere [concerning : temperature and atmospheric pressure].
4. There is no ionosphere layer at the top of thermosphere layer.
5. Meteors move with very high velocity in mesosphere layer.

## 12. Compare between :

1. Altimeter and aneroid [in the view of their usage].
2. Troposphere and stratosphere layers.
3. Tropopause and stratopause [concerning the place].
4. Ionosphere layer and ozone layer [concerning : the importance and the place].
5. 🕮 Mesosphere and thermosphere.
   [concerning : temperature, importance and atmospheric pressure].

## 13. Problems :

1. Find temperature at a point of height 10000 meters above sea level if the temperature at sea level is 24°C.
2. Find temperature at a point of height 2000 meters above sea level if the temperature at the sea level is 23°C.
3. If temperature at sea level is 24.5°C, find temperature at the top of troposphere layer if its thickness is 13 kilometers.
4. 🕮 Calculate the height of a mountain if the temperature at its base is 30°C and at its top is (– 9°C).
5. From the opposite figure, calculate the temperature at :
   a. Point (B) if the temperature at point (A) = 26.5°C
   b. Point (C) if the temperature at point (B) = 10.25°C






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## 14. Variant questions :

(1) 📖 **Arrange the layers of atmospheric envelope according to the nearest to the Earth's surface.**

(2) **Arrange the following measurements in a table containing the following :**

- Altitude above sea level 9 km , 6 km , 3 km, 12 km
- Temperature at this height – 54°C , – 15°C, 4.5°C , – 34.5°C
- Atmospheric pressure 323 mb , 731 mb , 203 mb, 503 mb

(3) **Explain an activity to show how atmospheric pressure changes by changing altitude.**

(4) 📖 **An aeroplane captain announced that the atmospheric pressure outside the aeroplane is 90 millibar.**

In which layer of the atmosphere was the aeroplane flying ? Why ?

(5) **Write brief notes on the relation between rising above sea level and atmospheric pressure.**

(6) **In one of the Earth areas, we watch bright light curtains in the sky :**

1. What is this phenomenon called ?
2. Why does this phenomenon happen ?
3. Where do we can see this phenomenon ?

## 15. Study the following figure, then answer the questions :

(1) **Look at the opposite figures, then answer the following questions :**

1. What is the name of each instrument ?
2. What is the importance of each one ?



(a)

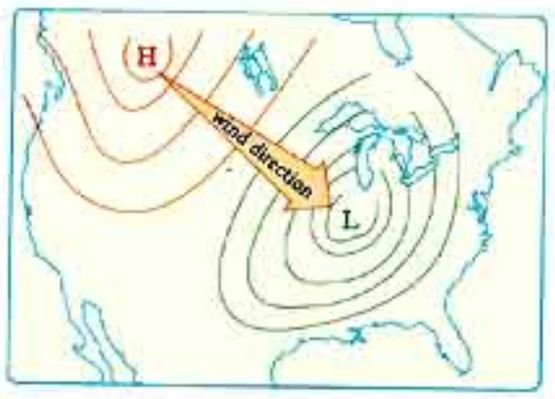


(b)

(2) **The opposite figure represents the atmospheric pressure map.**

**Answer the following questions :**

1. The lines that are present on the map represent .....
2. The symbol "H" on the map represents ....., while the symbol "L" on the map represents .....
3. In which direction does the wind move ?

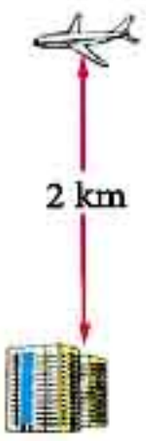





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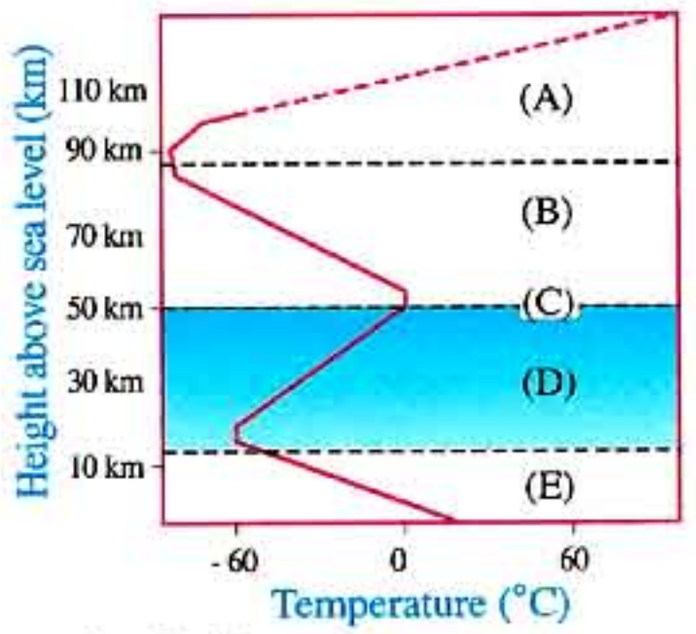
**(3) From the opposite figure :**

Calculate the height of the building if you know that the temperature which is recorded at the aeroplane = 3°C and the temperature which is recorded at the Earth's surface = 19.25°C.



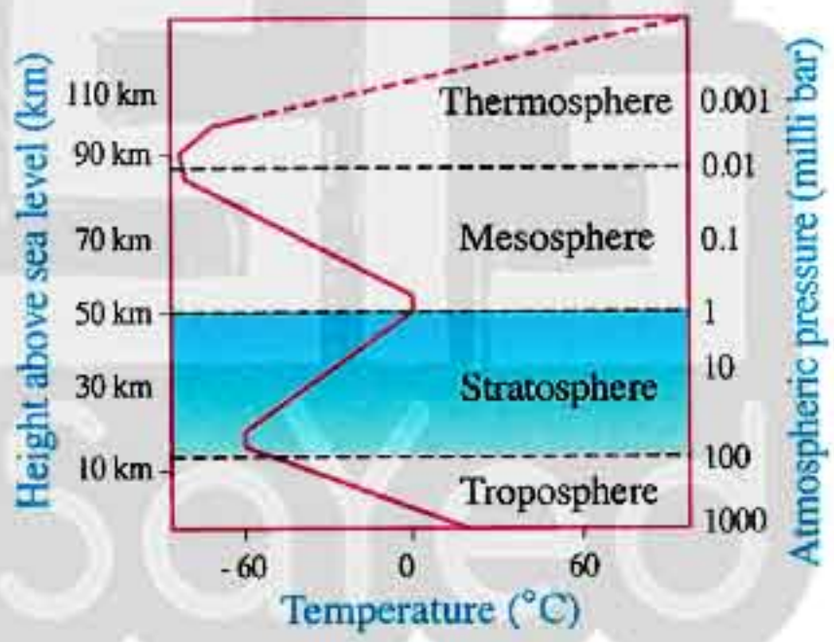

**(4) 🕮 The opposite figure exhibits the temperature changes in the layers of atmospheric envelope :**

1. Replace the letters on the drawing with suitable labels.
2. Which layer is .....?
   a. The highest in temperature.
   b. The lowest in temperature.




**(5) The opposite figure exhibits the temperature changes in the layers of atmospheric envelope :**

1. Which of the atmospheric layers .....?
   a. is of the highest pressure.
   b. the atmospheric pressure at its end is 1 millibar.
2. Mention the highest and lowest temperature in :
   a. Stratosphere layer.
   b. Mesosphere layer.




**(6) The following figure represents the two magnetic belts that surround the Earth planet :**

1. • What is their scientific name ?
   • Where are they located ?
2. What is the phenomenon that takes place as a result of their existence ?





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## 1. Choose the correct answer :

1. The value of the atmospheric pressure may be equal ..... mb. at the top of El-Mokattam mountain.

a. 1031.25 b. 1016.25 c. 1013.25 d. 1010

2. Region extends between 3 km and 16 km height, ..... of the mass of air is located.

a. 10 % b. 40 % c. 50 % d. 90 %

3. The total mass of the air which located in the first three layers of atmospheric envelope is about .....

a. 99 % b. 75 % c. 50 % d. 25 %

4. Molecules of air are very close to each other at .....

a. sea surface. b. 1 km. height. c. 3 km. height. d. 16 km. height.

5. In the lower part of the ..... layer, more than half of the mass of the air is located.

a. thermosphere b. troposphere c. mesosphere d. stratosphere

## 2. What happens when ....? :

a. Atmospheric pressure becomes equal at the all areas of the Earth.

b. Ionosphere doesn't contain charged particles.

**3.** Calculate the difference in temperature between 2 points (A and B) if their height above the sea surface is 8 , 10 km respectively.

**4.** If the temperature at the sea surface = 24°C, calculate the temperature at a point located below tropopause by 5 km.

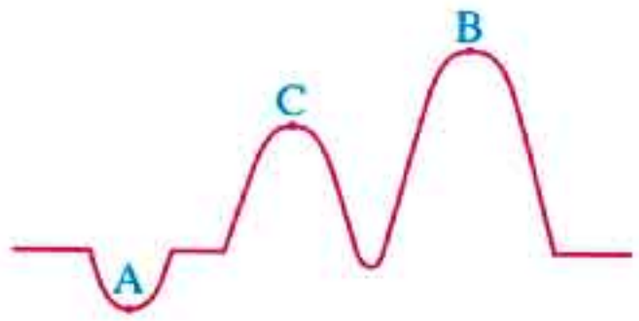
**5.** An aeroplane flying in the sky at a height of 15 km above sea level. If you know that the temperature inside the aeroplane = 20°C and the temperature at the sea level = 35°C. Calculate the difference in temperature between inside and outside the aeroplane.

**6. From the opposite figure :**

Calculate the height of the point (C) from the point (A).

If you know that :

- The temperature at point (A) = 24°C.
- The temperature at point (B) = 5°C.
- The height of point (B) from point (C) = 2 km.






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LESSON 2

# Erosion of Ozone Layer and Global warming



**What** are the dangers of the industrial development on our life ?

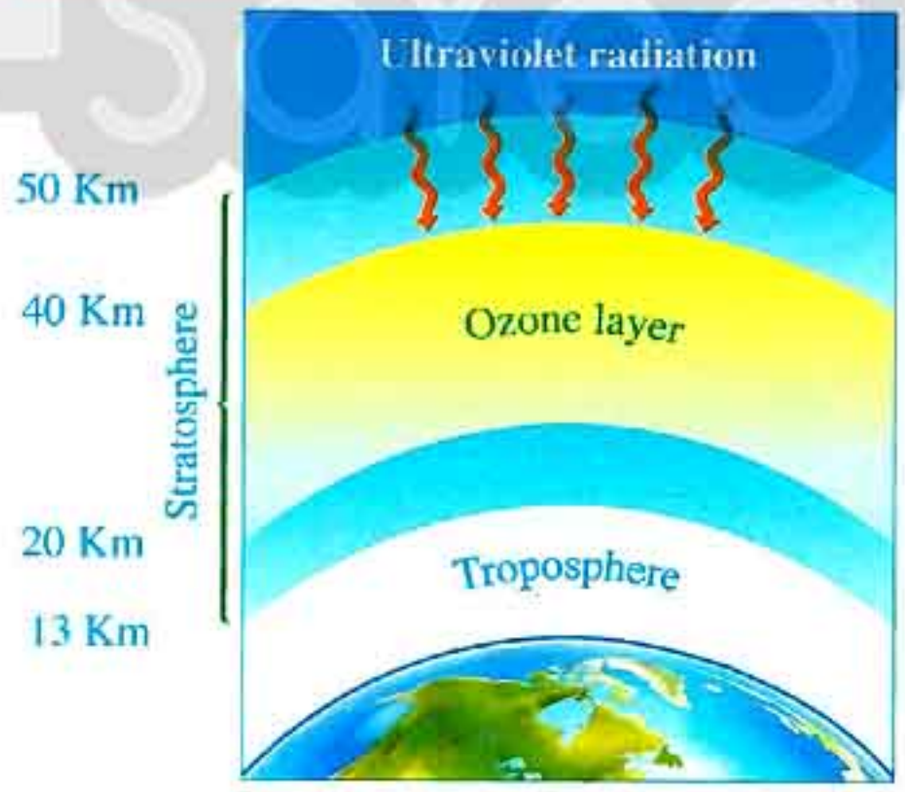
*There are two dangerous phenomena that have faced the Earth since the mid twentieth ($20^{th}$) century. These two phenomena are :*

**First** : Erosion of ozone layer phenomenon **(occurs in stratosphere)**.
**Second** : Global warming phenomenon **(occurs in troposphere)**.

## First Erosion of Ozone Layer phenomenon

### Location of ozone layer

- Ozone layer extends from 20 km to 40 km height above sea level in the stratosphere layer. GR.
  **because ozone layer is the first layer in atmosphere which contains suitable amount of oxygen gas, that faces ultraviolet radiations emitted from the Sun.**



Location of ozone layer

### Structure of ozone layer

- Ozone layer is composed of **ozone gas ($O_3$)** which consists of **three oxygen** atoms.



Ozone molecule



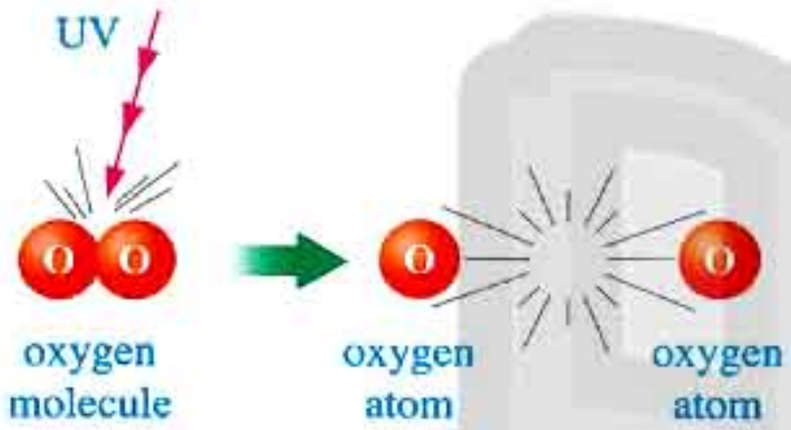
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UNIT 2

## Formation of ozone gas

### Step 1

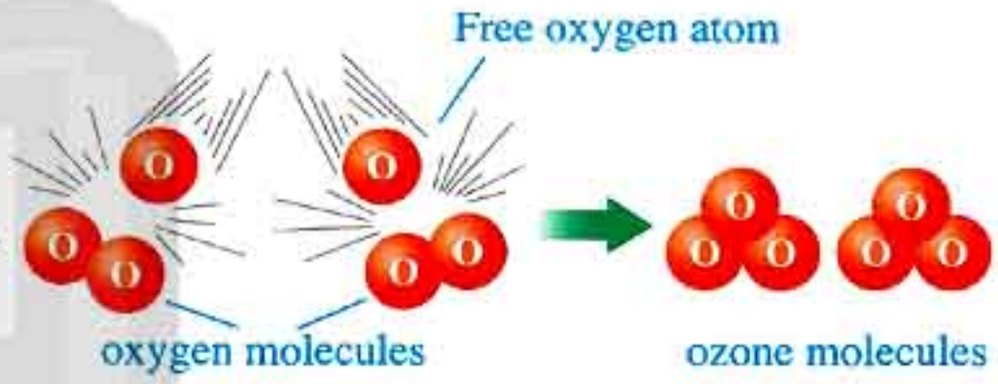
★ Oxygen gas molecule ($O_2$) absorbs ultraviolet radiation (UV), which causes the break down of its double covalent bond giving two free oxygen atoms (2O).




$$O_2 \xrightarrow{UV} O + O$$

### Step 2

★ Each free oxygen atom (O) combines with another oxygen molecule ($O_2$) forming ozone molecule ($O_3$) which is composed of three oxygen atoms.




$$O + O_2 \longrightarrow O_3$$

## Thickness of ozone layer

- The atmospheric pressure in stratosphere layer is 0.001 bar of normal atmospheric pressure at the sea level.
- The temperature is less than that at the sea level.

- So ozone gas spread forming a layer of 20 km thickness.

- But, the English scientist **Dobson** postulated that the thickness of the ozone layer is compressed into only **3 mm (millimeter)**, if it were subjected to the ordinary temperature and normal atmospheric pressure which is known as (STP).

**[STP means standard temperature (O°C) and pressure (1013.25 mb)].**

**▸ Enrichment information**

*Ozone gas has a faint blue colour and a distinct smell. This can be observed near instruments that contain electric discharge pipes as in the cases of light photographic machines and TV sets.*




Accordingly, he assumed that the normal degree of ozone is **300 Dobson**, where each 1 mm. thickness is equivalent to 100 Dobson).

- Scientists took "**Dobson**" as a measuring unit of the degree for ozone layer.



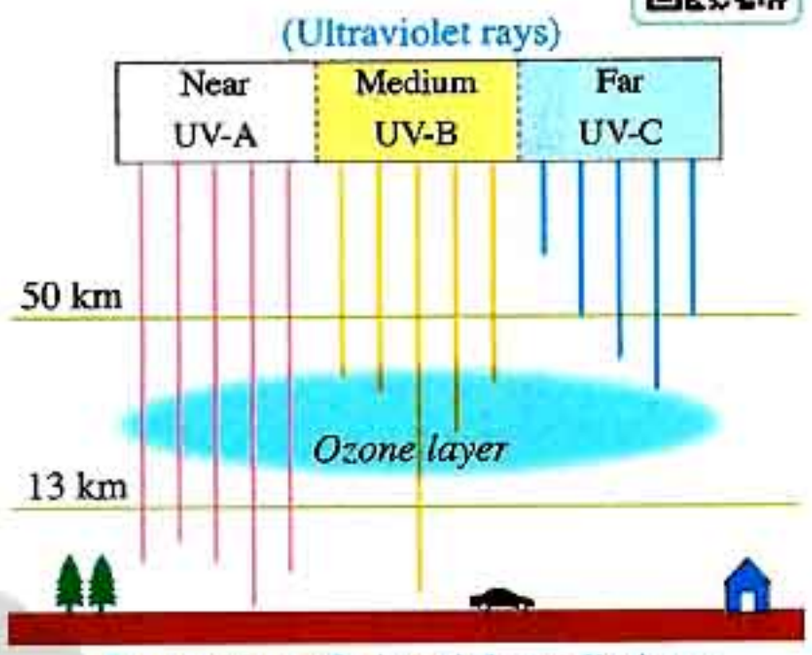
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Lesson Two

## Importance of ozone layer

- To know the importance of ozone layer ,
  we should know the types of ultraviolet (UV) rays.
- There are three types of UV rays
  that differ in wavelength and range
  of penetration through ozone layer.
- Wavelength measuring unit is nanometer :

1 Nanometer (nm) = $1 \times 10^{-9}$ meter (m)



Penetration of ultraviolet radiations through ozone layer

**As in the opposite figure and the following table :**

| UV rays | Near ultraviolet rays | Medium ultraviolet rays | Far ultraviolet rays |
|---|---|---|---|
| - Wavelength | 315 : 400 nm | 280 : 315 nm | 100 : 280 nm |
| - Range of penetration through ozone layer. | - Penetrate Ozone layer by a percentage 100% | - Don't penetrate Ozone layer by a percentage 95% | - Don't penetrate Ozone layer by a percentage 100% |
| - Its effect on living organisms. | - It is useful for the life of living organisms. | - It is harmful for the life of living organisms. | - It is harmful for the life of living organisms. |

☆ **From the previous explanation, we conclude that the ozone layer acts as a protective shield for living organisms against the chemical harmful effects of ultraviolet radiations.**

### Enrichment information

*Ultraviolet radiation with wavelength close to the visible light penetrates the atmosphere and reaches the Earth's surface where it helps in synthesis of vitamin (D) in the bodies of the newly born babies.*

## Erosion of ozone layer

- Since 1978, scientists have noticed that there was erosion of ozone layer **above the South Pole**. This phenomenon is known as an **ozone hole** that increases in **September** each year GR. **because all pollutants assemble as black clouds that are pushed by wind towards South Pole making ozone depletion increase from year to year.**





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UNIT 2

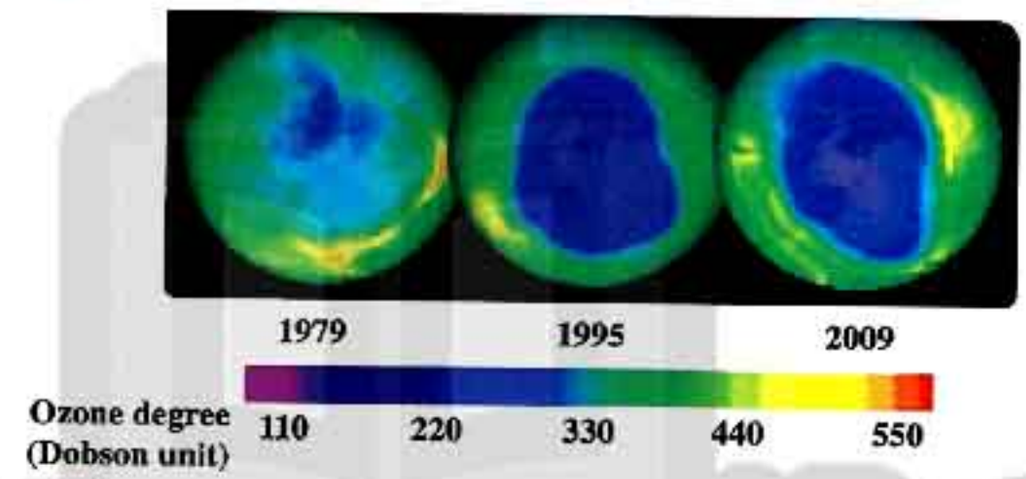
## Ozone hole:

It means thinning or losing parts of ozone layer above the south pole.

**Enrichment information**

*- In fall 2001, erosion of ozone layer reached $20 \times 10^6$ km$^2$ which equals twenty times the area of Egypt. In autumn 2008, it reached 27 $\times 10^6$ km$^2$ (i.e larger than North America).*

### The following figure represents the ozone degree during the period [1979 : 2009]




The erosion of ozone layer increases by increasing the area of blue and violet colours.

**where,**

**Green colour**
refers to regions, in which the ozone is in its normal state (equals 300 Dobson).

**Violet colour**
refers to regions, in which erosion of ozone layer (lower than 300 Dobson).

**We can determine the percentage of erosion of ozone layer in a certain area as the following :**

The degree of erosion of ozone layer (in a certain area) = The normal degree of ozone layer (300 dobson) – The degree of ozone in this area

The ratio of erosion of ozone layer (in a certain area) = $\frac{\text{The degree of erosion of zone layer}}{\text{The normal degree of ozone layer}} \times 100$

### Exercise 1

***What is the percentage of erosion of ozone layer in an area if you know that the degree of its ozone is 150 dobson?***

TRY TO ANSWER worksheet in the Notebook 14

### Answer

The degree of erosion of ozone layer in an area = 300 – 150 = 150 dobson.

The ratio of erosion of ozone layer in this area = $\frac{150}{300} \times 100 = 50\%$



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Lesson Two

## Pollutants of ozone layer

**1** **Chlorofluorocarbon compounds ($CFC_s$):**

**They are commercially known as Freon, which is used as :**

- A cooling substance in air conditioning sets.
- A propellant substance in aerosols.
- A flating substance in making foam backing.
- A solvent substance for cleaning electric circuits slides.

(we must reduce the use of chlorofluorocarbon and find safer alternatives to protect the ozone layer)



**2** **Methyl bromide gas :**

It is used as an insecticide to preserve stored agricultural crops.



**3** **Halons :**

They are used in extinguishing fires.



**4** **Nitrogen oxides :**

They are produced from the burning of fuel of ultrasound concorde aeroplanes.

(we must stop producing the concorde aeroplanes to protect the ozone layer)



## Second Global Warming phenomenon

Researches of the **IPCC** (*the Intergovernmental Panel on Climate Change*) that follows UN (*United Nations*) showed that there is an increase in the average temperature of the Earth's near-surface air, which is known as **global warming phenomenon**.



### Global warming phenomenon:

It is the continuous increase in the average temperature of the Earth's near-surface air.



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UNIT 2

★ **The following figure shows the rising of the planet Earth's temperature during the past years.**




Rising of planet Earth's temperature

## Reasons for global warming phenomenon

Researches have also shown that the global warming phenomenon is caused by the greenhouse effect.

### ACTIVITY To know the greenhouse effect :

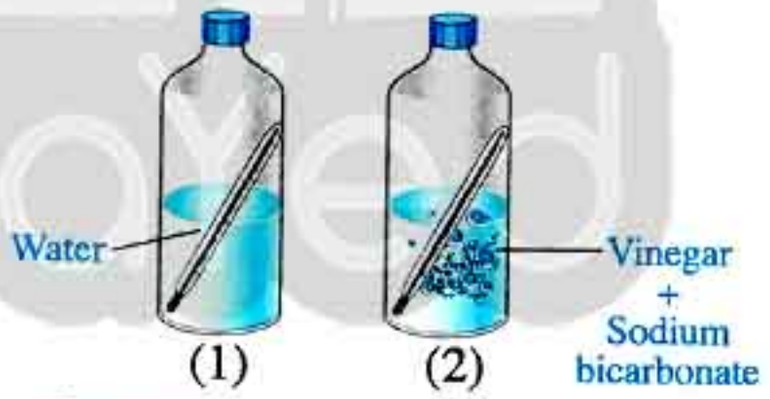
**Tools :**

- 2 empty soda bottles.
- 2 thermometers.
- Sodium bicarbonate powder.
- Water.
- Vinegar.



**Steps :**

1. Pour some water in bottle (1) and the same amount of vinegar in bottle (2).
2. Insert a thermometer in each bottle.
3. Close bottle (1) and put some sodium bicarbonate powder in bottle (2) and close it immediately.
4. Put both bottles in a sunny place for 10 minutes.




**Observation :**

- Evolving of gas bubbles in bottle (2).
- Higher reading of the thermometer in bottle (2).

**Note**

$CO_2$ gas is produced from the reaction between sodium bicarbonate and vinegar.

**Conclusion :**

The increase in the concentration of $CO_2$ gas leads to the increase in temperature.

**Similarly :**

**The temperature of the planet Earth has been increasing since 1935 due to increasing the greenhouse gases (especially $CO_2$).**

TRY TO ANSWER worksheet in the Notebook 15



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## The most important greenhouse gases :

1. Carbon dioxide gas ($CO_2$).
2. Chlorofluorocarbons ($CFC_s$) compounds.
3. Methane gas ($CH_4$).
4. Nitrous oxide ($N_2O$).
5. Water vapour ($H_2O$).

**For illustration**

*The percentage of $CO_2$ is increased in the atmosphere to 0.038 % in 2005 after it was 0.031%*

## The reasons for increasing greenhouse gases ratio in the atmosphere :

**1. Fossil fuel burning.**



**2. Cutting trees.**



**3. Forests fires.**



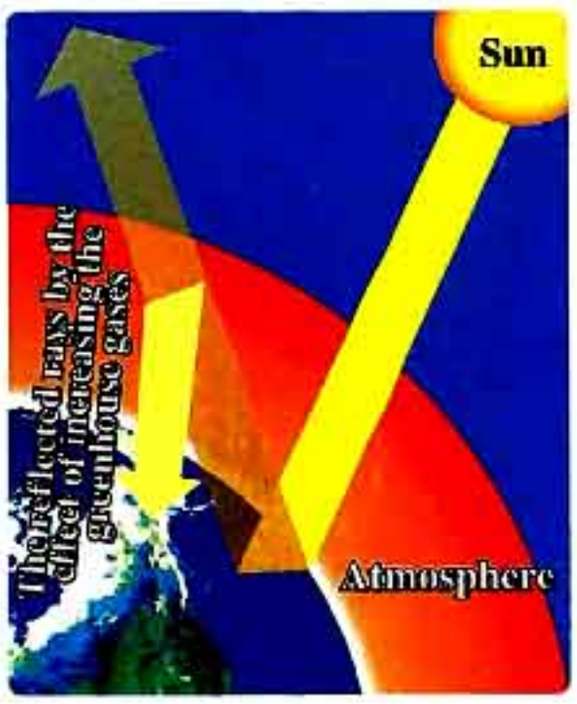
## Interpretation of the greenhouse phenomenon

When the concentration of greenhouse gases increases in the atmosphere, the atmosphere plays the role of glass in the greenhouse as :

1. It permits the visible light and short-waved rays emitted from the Sun to pass.
2. The Earth and its components absorb these rays and reemit the radiation back in the form of **infrared radiation**.
3. The infrared radiation cannot penetrate the atmosphere **because it has a long wavelength**.

**So,** it is kept trapped in the troposphere causing the rise in the planet Earth's temperature which is known as Greenhouse effect.






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UNIT 2

## Greenhouse effect:

It is the trapping of infrared radiation in the troposphere layer due to the increase in the percentage of greenhouse gases which cause the increase in the planet Earth's temperature.



Greenhouse effect

**Note**

The ultraviolet radiation has a **chemical effect**, while infrared radiation has a **thermal effect**.

**Enrichment information**

*Greenhouse gases are considered a blessing which can be changed into a catastrophe, where without these gases, the temperature of the Earth would have decreased to – 18°C and the increase in its concentration in the atmosphere will lead to environmental disasters.*

## The negative effects of global warming phenomenon

**Among the most dangerous consequences of global warming phenomenon, are :**

**1. Melting the snow of the two poles.**

**2. Severe climatic changes.**

### 1 Melting the ice and snow of both South and North Poles :

**Melting the polar ice would increase the level of seas and oceans, which leads to :**

1. Costal areas as they could drown.
2. Extinction of some polar animals like the polar bear and seals.



Melting of snow masses



Polar bear



Seals



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Lesson Two

## 2 Severe climatic changes :

**Among these features is the repeated occurrence of :**

**1. Tropical hurricanes such as hurricane Katrina in 2005.**



**2. Destructive floods.**



**3. Drought waves.**



**4. Forests fires.**



**TRY** TO ANSWER worksheet 16
- General Exercise of the School Book on Unit 2
- Model exams on Unit 2

in the Notebook

RaNia Soos

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- Ozone layer extends from 20 km to 40 km above sea level in the stratosphere layer.
- Ozone molecule is composed of three oxygen atoms ($O_3$).
- At STP, thickness of the ozone layer is compressed into 3 mm according to scientist Dobson.
- Ozone layer acts as a protective shield for living organisms against the harmful chemical effects of ultraviolet radiations.
- **Ozone hole :** Thinning or losing parts of ozone layer above the south pole.
- From pollutants of ozone layer : CFCs, methyl bromide gas, halons and nitrogen oxides.
- **Global warming phenomenon :** It is the continuous increase in the average temperature of the Earth's near-surface air.
- The most important greenhouse gases :

  $CO_2$ gas - CFCs Compounds - Methane gas - Nitrous oxide - Water vapour.
- **Greenhouse effect :**

  It is the trapping of infrared radiation in the troposphere layer due to increase in the percentage of greenhouse gases, which cause the increase in planet Earth's temperature.
- Ultraviolet radiation has a chemical effect, while infrared radiation has a thermal effect.
- Among the most dangerous effect of global warming phenomenon are :
  - melting the snow of the two poles.
  - Severe climatic changes.

**Comparison between greenhouse effect and ozone hole :**

| Points of comparison | Greenhouse effect | Ozone hole |
|---|---|---|
| • **Reasons :** | • Carbon dioxide gas ($CO_2$).<br>• Chlorofluorocarbon (CFCs) compounds.<br>• Methane gas ($CH_4$).<br>• Nitrous oxide ($N_2O$).<br>• Water vapour ($H_2O$). | • $CFC_s$ compounds.<br>• Methyl bromide gas.<br>• Halons.<br>• Nitrogen oxides. |
| • **Harms :** | Increasing the Earth's temperature causing global warming. | Penetration of harmful ultraviolet rays to Earth's surface which threaten the life of living organisms. |



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# Questions
## on lesson two



Questions signed by 📖 have been taken from the school book.

## 1. Choose the correct answer :

1. Ozone layer locates in ..... layer.
   a. troposphere  b. stratosphere  c. mesosphere  d. thermosphere
2. Ozone gas molecule consists of .....
   a. four oxygen atoms.  b. two oxygen atoms.
   c. three oxygen atoms.  d. one oxygen atom.
3. Oxygen molecule splits into two free atoms in the stratosphere layer under the effect of .....
   a. heat.  b. infrared radiations.
   c. ultraviolet radiations.  d. cooling down.
4. Scientist ..... proposed that the thickness of ozone layer is about 3 mm under the standard temperature and pressure.
   a. Newton  b. Edeson  c. Dobson  d. Watson
5. 📖 Ozone degree is measured in a unit called .....
   a. km.  b. Dobson.  c. $mm^2$.  d. nm.
6. Degree of ozone at STP condition is ..... Dobson.
   a. 100  b. 200  c. 300  d. 400
7. One Dobson unit (DU) is defined as .....
   a. 3mm.  b. 0.1mm.  c. 0.01mm.  d. no correct answer.
8. Ozone layer absorbs .....
   a. infrared rays.  b. ultraviolet rays.  c. x-ray.  d. light rays.
9. The ozone layer does not allow the passage of ..... ultraviolet rays.
   a. far  b. medium  c. near  d. (a) and (b) together
10. Ozone layer allows 100% of the ..... UV rays to penetrate the Earth's atmosphere.
    a. far  b. medium  c. near  d. (b) , (c)
11. Nanometer equals ..... meter.
    a. $1 \times 10^{-3}$  b. $1 \times 10^{-6}$  c. $1 \times 10^{-9}$  d. $1 \times 10^{-12}$
12. Ozone hole appears over the .....
    a. Equator.  b. North pole.  c. South pole.  d. Middle East.
13. Ozone hole increases in ..... each year.
    a. December  b. September  c. January  d. October
14. ..... compounds are known commercially as freon.
    a. Halons  b. Nitrogen oxides  c. Hydrocarbons  d. Chlorofluorocarbon
15. Chlorofluorocarbon compounds are used as .....
    a. solvent substance.  b. flating substance.
    c. propellant substance.  d. all the previous answers.



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UNIT 2

16. ..... is used as coolant in cooling devices.
a. Methyl bromide gas b. Halons
c. Nitrogen oxide d. Freon

17. ..... is/are used in extinguishing fires.
a. Methyl bromide gas b. Halons
c. Nitrogen oxides d. UV radiations

18. All of the following cause erosion of ozone layer except .....
a. freon. b. aerosols. c. nitrogen oxides. d. iron oxides.

19. ..... is used as an insecticide to preserve stored agricultural crops.
a. Methyl bromide gas b. Halons
c. Nitrogen oxide d. Freon

20. ..... results from the burning fuel of ultrasound aeroplanes (concord).
a. Methyl bromide gas b. Halons
c. Nitrogen oxide d. Freon

21. Greenhouse effect explains .....
a. erosion of ozone layer. b. global warming phenomenon.
c. a new way of agriculture. d. water evaporation.

22. 📖 All of the following gases are greenhouse gases except .....
a. $CO_2$ b. $O_2$ c. $N_2O$ d. $CH_4$

23. Global warming occurs due to the .....
a. increase in carbon dioxide in the atmosphere.
b. decrease in carbon dioxide in the atmosphere.
c. cutting trees and forest fires.
d. (a) and (c) together.

24. From the negative effects of global warming is/are .....
a. melting the ice at the north and south poles.
b. severe climatic changes.
c. the lack of ozone gas in the atmospheric envelope.
d. (a) & (b) together.

25. 📖 ..... is (are) among the reasons for increasing $CO_2$ gas ratio.
a. Fossil fuel burning b. Cutting trees
c. Forests fires d. All the previous answers

26. ..... radiation is characterized by great heat effect.
a. Infrared b. Ultraviolet
c. Visible light d. No correct answer

27. ..... is(are) among the extinct animals because of melting of ice in the north and south pole (as a result of global warming).
a. Polar bear b. Blue whale c. Seal d. (a) and (c) are correct



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## 2. Choose from column (B) the phrases that correspond to those of column (A) and rewrite the complete phrases :

(1)

| (A) | (B) |
|---|---|
| 1. The thickness of ozone layer in the stratosphere layer is | a. 100% |
| 2. The thickness of ozone layer at STP conditions is | b. 95% |
| 3. The percentage of near UV radiations that are absorbed by the ozone layer is | c. 20 km |
| 4. The percentage of medium UV radiations that don't penetrate ozone layer is | d. 40 km |
| | e. 3 mm |
| | f. 0% |

(2)

| (A) | (B) |
|---|---|
| 1. Freon is used in | a. Extinguishing fires |
| 2. Methyl bromide is used in | b. Making foam boxes |
| 3. Halons are used in | c. Iron industry |
| | d. Insecticides |

(3)

| (A) | (B) |
|---|---|
| 1. Methane gas | a. $H_2O$ |
| 2. Water vapour | b. $CO_2$ |
| 3. Nitrous oxide | c. $CH_4$ |
| 4. Carbon dioxide | d. $CFC_s$ |
| 5. Chlorofluorocarbons | e. $NO_2$ |
| | f. $N_2O$ |

## 3. Put (✓) or (×) and correct the wrong ones :

1. Ozone layer is found in the stratosphere layer. ( )
2. Ozone molecule is formed by the bonding of two oxygen atoms. ( )
3. The ozone layer extends from 20 to 30 km above sea level. ( )
4. Ultraviolet radiation splits the ozone molecule into two atoms. ( )
5. The millibar is the unit of measuring the ozone degree. ( )
6. Nanometer (nm) = $1 \times 10^9$ m ( )
7. The ozone layer allows the passage of all near and medium ultraviolet rays. ( )
8. The ozone layer acts as a protective shield for the living organisms. ( )
9. The compounds of nitrogen oxides are among pollutants that affect the ozone layer. ( )
10. Freon is used as a coolant in cooling devices. ( )
11. Methyl bromide gas is used as an insecticide. ( )
12. Nitrogen oxides result from fuel burning. ( )
13. Halons are produced among the burning of fuel of supersonic aeroplanes. ( )



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14. The ozone layer erosion differs in size every year. ( )
15. The increase in carbon dioxide gas percentage in the atmospheric envelope leads to the increase in temperature. ( )
16. Lacking of plants on the Earth leads to the increase in temperature. ( )
17. Infrared radiation can't penetrate the atmosphere because of its short wavelength. ( )
18. Methane gas and nitrous oxide are considered as greenhouse gases. ( )
19. $CFC_S$ compounds are from the causes of ozone hole and global warming. ( )
20. Extinction of some polar animals is one of the negative effects of global warming phenomenon. ( )
21. From the negative effects of climatic changes the happening of tropic hurricanes, destructive floods, drought waves and forests fires. ( )

## 4. Write the scientific term:

1. A molecule is formed by combining an atom of an element with molecule of the same element.
2. A gas which is important for building ozone gas.
3. A kind of radiations that can break down oxygen molecule forming free oxygen atoms.
4. The atmospheric layer, in which ozone layer is formed.
5. A kind of gases formed in the stratosphere.
6. A unit used for measuring ozone degree.
7. An atmospheric layer that acts as a shield which protects living organisms from the danger of ultraviolet radiation.
8. A type of ultraviolet radiations that is absorbed completely (100%) by the ozone layer.
9. A type of ultraviolet rays that is absorbed by a percentage 95% by ozone layer.
10. A type of ultraviolet rays that penetrates the ozone layer by a percentage 100%.
11. A kind of rays that causes harmful effects to living organisms.
12. Thinning or losing parts of ozone layer above the South pole.
13. A chemical compound used as a cooling material in air conditioning sets and refrigerators.
14. A gas used as an insecticide and causes the increase in ozone hole.
15. Compounds used in extinguishing fires and considered from the most dangerous pollutants of ozone layer.
16. Oxides that cause ozone hole and result from burning of the fuel of concorde planes.
17. The continuous increase in the average temperature of the air near the surface of the Earth.
18. Gases when their percentages increase, the temperature of the planet Earth increases.
19. A kind of rays that causes the rise in temperature in troposphere layer.
20. • Trapping of infrared radiation in troposphere layer due to the increase in the percentage of greenhouse gases which leads to the increase in the planet Earth's temperature.
    • A phenomenon that causes the increase in the percentage of carbon dioxide and leads to an increase in planet Earth temperature.



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## 5. Complete the following statements :

1. ..... and ..... are the two most dangerous phenomena that face the Earth's atmosphere.
2. Ozone layer extends from ..... to ..... km above sea level.
3. Ozone layer is formed in ..... layer and its thickness is about ..... km.
4. The ozone layer is located in the stratosphere which contains a suitable amount of ..... gas.
5. ..... is formed by the combination of three active oxygen atoms.
6. On the formation of ozone layer the oxygen molecule absorbs ..... which breaks the bond between its ..... then each free oxygen atom bonds with ..... forming the ozone molecule.
7. Ozone gas is formed in two steps which are :

   (a) $O_2 \xrightarrow{UV} O + .....$ (b) $O + ..... \longrightarrow O_3$
8. The thickness of ozone layer is about ..... mm or equals ..... Dobson at the standared temperature and pressure.
9. The ultraviolet rays are three kinds which are ..... , ..... and ..... ultraviolet rays.
10. The nanometer equals ..... meter.
11. Ozone layer allows penetration of all ..... ultraviolet rays and absorbs most of ..... ultraviolet rays.
12. .....% of far ultraviolet rays of wavelength ..... ; ..... nm don't penetrate ozone layer.
13. The erosion of ozone layer above the ..... pole increases in the month of ..... every year.
14. ..... , ..... and ..... are considered among pollutants of ozone layer.
15. $CFC_s$ compounds are commercially known as ..... and they are used in .....
16. 📖 Among the pollutants of ozone layer are ..... compounds that are used in air conditioning sets and ..... compounds that are used in extinguishing fires.
17. ..... is used as insecticide to preserve the agriculture storage.
18. ..... oxides are produced from burning the fuel of supersonic aeroplanes (concorde).
19. The global warming phenomenon means .....
20. Among the reasons for increasing $CO_2$ gas ratio in the atmosphere is burning of ..... and .....
21. The most known greenhouse gases are ..... , $CFC_s$ , ..... and nitrous oxide.
22. When the density of greenhouse gases increases in the Earth's atmospheric envelope, it allows the passage of ..... and .....
23. The glass permits the passage of ..... and ..... rays coming from the Sun to be absorbed by Earth in the greenhouse.



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UNIT 2

24. ..... radiation is trapped in troposphere layer, because this kind of radiation has ..... wavelength.

25. 📖 Ultraviolet radiation has a ..... effect, and the infrared radiation has a ..... effect.

26. ..... and ..... are among negative effects of global warming phenomenon.

27. ..... and ..... are considered from the negative effects of the climatic changes resulting from global warming.

## 6. Give reasons for :

1. 📖 Formation of ozone layer in the stratosphere layer.
2. The ozone layer acts as a protective shield for the living organisms.
3. The continuity of ozone layer erosion.
4. Increasing the size of ozone hole in September every year.
5. Chlorofluorocarbon compounds are dangerous to the environment.
6. Factories should stop their production of foam boxes.
7. Scientists ban using freon as a cooling material.
8. 📖 Stopping manufacturing of concorde aeroplanes.
9. Increasing the average temperature of the Earth's near-surface air during the last years.
10. Increasing in $CO_2$ gas percentage in the atmosphere.
11. Infrared radiation cannot penetrate the Earth's atmosphere.
12. The trading or producing $CFC_s$ compounds is prohibited.
13. The global warming phenomenon has negative effects on Earth.
14. Most countries are attempting to reduce the use of fossil fuel.

## 7. What is meant by each of the following .....?

1. Dobson.
2. STP
3. Ozone hole.
4. $CFC_s$
5. IPCC
6. Global warming phenomenon.
7. Greenhouse gases.
8. Greenhouse effect.

## 8. What do the following numbers indicate .....?

1. Three oxygen atoms.
2. 280 : 315 nm.
3. $1 \times 10^{-9}$ m.
4. A layer of 20 km thickness in stratosphere layer.
5. 300 Dobosn units.

## 9. What is the importance of :

1. Ultraviolet radiations.
2. Ozone layer.
3. Chlorofluorocarbon compounds.
4. Methyl bromide gas.
5. Halons.
6. Freon.



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## 10. Give an example of each of the following :

1. Dangerous pollutant causes depletion of ozone layer.
2. Greenhouse gases.
3. One of the severe climatic changes.

## 11. Explain the role of :

1. 📖 Ultraviolet radiation in the formation of ozone layer.
2. $CO_2$ in global warming phenomenon.
3. Infrared radiation on global warming.

## 12. Choose the odd word out and link the rest in meaningful statements:

1. Nitrogen oxides - Water vapour - Freon - Halons.
2. Cooling instruments - Cleaning electronic slides - Extinguishing fires - Aerosols propellers.
3. Methyl bromide - Carbon dioxide - Water vapour - Methane gas.
4. Nitrous oxide - Carbon dioxide - Halons - Chlorofluorocarbon compounds.
5. Fluorine - Carbon - Oxygen - Chlorine.
6. Floods - Forests fires - Drought waves - Greenhouse effect.

## 13. What would happen when ..... ?

1. Ultraviolet radiation hits oxygen molecules.
2. Oxygen atom combines with oxygen molecule.
3. Existence of ozone in conditions of standard temperature and pressure (STP).
4. Overuse of methyl bromide gas as an insecticide.
5. Overuse of freon.
6. Increasing in percentage of nitrogen oxides in the atmospheric envelope.
7. The ozone layer is broken down over an area.
8. Increasing in the percentage of greenhouse gases in the atmosphere.
9. Infrared radiation don't reemit back from troposphere layer.
10. The melting rate of polar ice increased (concerning the coastal regions).
11. Earth's temperature increases (concerning climatic changes).
12. The continuous increase in consumption of fossil fuel.

## 14. Compare between :

1. Oxygen molecule and ozone molecule.
   "Concerning : structure - the atmospheric layer which contains the most ratio of it".
2. Far ultraviolet radiations and near ultraviolet radiations.
   "Concerning : the percentage which penetrates the Earth - the wavelength".
3. Greenhouse effect and ozone hole.
   "Concerning : causes - harms".



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## 15. Variant questions :

(1) **"Ozone layer is found in the stratosphere layer.**
**It is important to protect the life of organisms"**

1. What is the average thickness of ozone layer in the atmosphere?
2. What is the only element that forms ozone gas?
3. Complete :
   a. Ozone layer protects the Earth from the harmful effects of ..... radiation.
   b. The thickness of ozone layer at STP is .....
4. Put (✓) or (✗) :
   Ozone layer prevents penetration of all types of UV radiation. ( )

(2) 🕮 **Illustrate with formulae and equations only, the role of ultraviolet radiation in the formation of ozone gas.**

(3) **"The erosion of ozone layer is a phenomenon occured by many pollutants". Answer the following questions :**

1. What are the most dangerous pollutants of ozone layer?
2. What is the commercial name of $CFC_s$ compounds?
3. What are the oxides produced from the burning of fuel of concorde aeroplanes?
4. Complete : If the erosion of ozone layer above an area is 25%, this means that the degree of ozone above this area is ..... Dobson.
5. Mention the ways by which ozone layer can be protected.

(4) **"Researches of the intergovernmental panel on climatic change showed that there is an increase in the average temperature of air"**

a. What is the name of this phenomenon?
b. What are the factors that help in making it worse?
c. How does this phenomenon threaten the life of polar animals?

(5) **Explain an activity to show the global warming phenomenon.**

(6) 🕮 **Write short notes about :**

1. The negative results of global warming.
2. Greenhouse phenomenon.

(7) **Calculate the ratio of erosion in ozone layer in certain area, knowing that ozone degree at this area is 255 dobson.**

(8) **Earth's weather is exposed to many climate changes :**

(A) Mention examples about these climate changes.
(B) What is the reason for causing of these climate changes ?



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## 16. Study the following figures, then answer the questions :

**(1) Which of the following figures represents:**

1. an oxygen atom.



Fig. (a)

2. an ozone molecule.



Fig. (b)

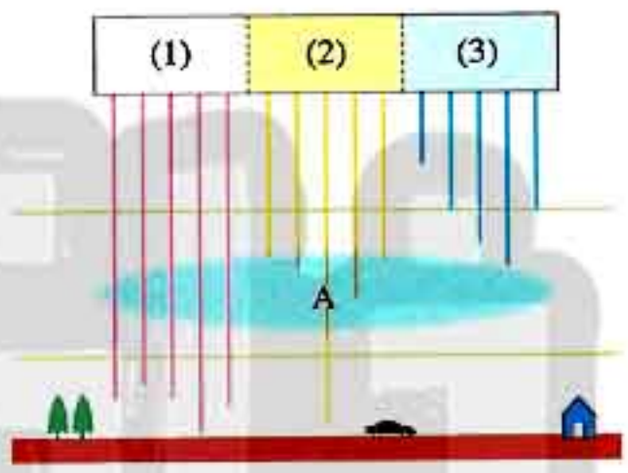
3. an oxygen molecule.



Fig. (c)

**(2) From the opposite figure, answer the following questions :**

1. What do the rays (1) , (2) and (3) represent ?
2. Which of these rays (1) , (2) or (3) has the longest wavelength ?
3. What does the area (A) indicate ? What is its thickness ? and where does it locates ?
4. Mention some compounds affects on the area (A).




**(3) Study the opposite figure, then answer :**

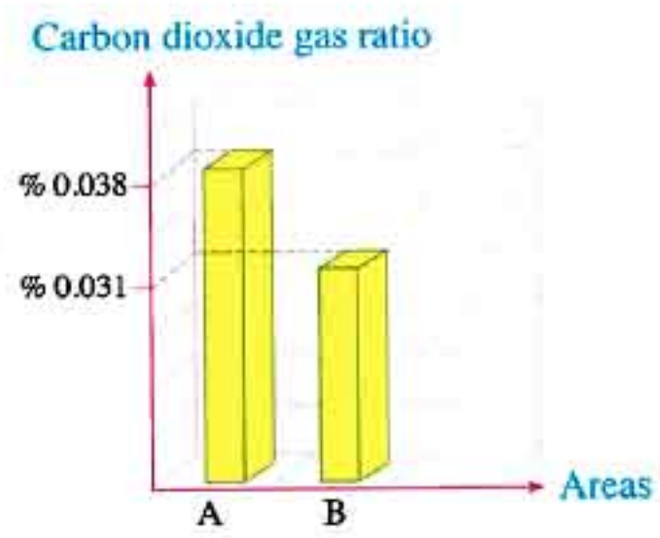
1. What is the evolved gas from bottle (2) ?
2. In which bottle the temperature increases. why ?




**(4) The opposite figure represents the ratio of carbon dioxide gas in two different areas.**

**Answer the questions :**

1. In which area do you prefer to live ? Why ?
2. What is the phenomenon resulted from increasing the concentration of carbon dioxide gas in nature ?






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UNIT 2

**(5) Study the opposite figure and answer the following questions :**



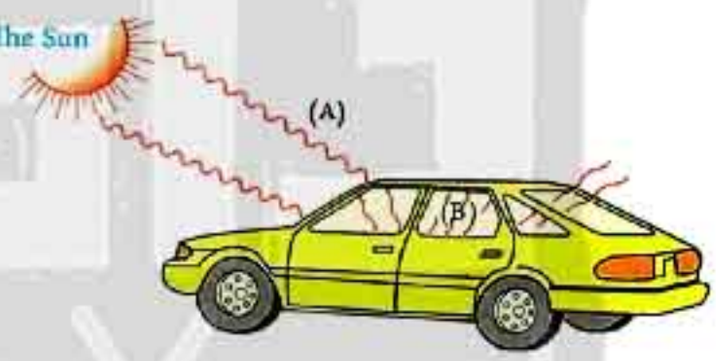
1. What does this figure represent?
2. 🕮 What is the similarity between greenhouse effect and global warming phenomenon ?

**(6) Study the opposite figure and answer the following questions :**



1. What is the name of the scientific idea shown in the figure?
2. What is the type of radiation that is reflected back to the Earth?

**(7) The opposite figure shows a person in a car with closed windows :**




1. Replace the letters A & B with suitable labels.
   .....
2. What is the process expressed by this figure?
   .....

RaNia-SaYed



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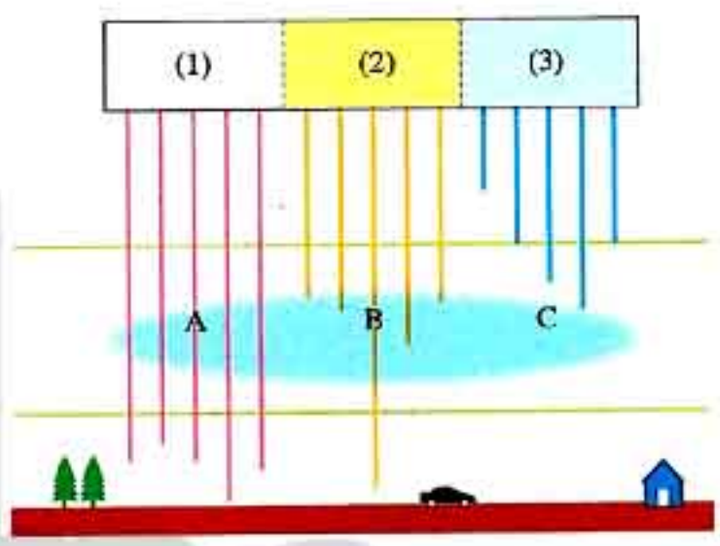



**1.** Explain how planting green plants on the roof of the building decrease the global warming phenomenon.

**2.** In the opposite figure :

a. What is percentage of absorbed ultraviolet in the area symbolized by (c) ?

b. What is the causes of the ability of penetration the (near UV) ozone layer ?




**3.** Complete :

If the percentage of erosion of ozone layer in a certain area equals 75%, which means that the degree of ozone in this area equals ..... Dobson.



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UNIT

3

# Fossils and Protecting Species from Extinction



## Lessons of the unit :

1. Fossils.
2. Extinction.

## Unit Objectives :

**By the end of this unit, students will be able to :**

- Recognize the concept of fossil.
- Give different examples of fossils.
- Infer the types of fossils.
- Explain the ways of fossils formation.
- Design a mold of a candle.
- Design models of cast and mold.
- Compare between types of fossils.
- Mention the importance of studying fossils.
- Calculate the age range of some fossils.
- Appreciate the importance of the discovery of fossils in the service of man, environment and society.
- Establish a vision to take responsibility and take personal decisions to protect fossils.
- Collect data and information and expressed their opinion in the protection of fossils and their scientific and social importance.
- Use research skills and inquiry in the study of fossils.
- Define the concept of extinction.

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- Use fossils to indicate extinction of some types of organisms.
- Conclude the factors that cause extinction of some types of living organisms.
- Give examples of extinct and endangered species.
- Understand the effect of extinction on ecological equilibrium.
- Suggest new solutions to protect living organisms from extinction.
- Deal gently with the organisms and in a civilized manner with the environment.
- Act consciously with the environment and appreciate the importance of normal life.
- Appreciate the role of scientists in protecting living organisms from extinction.
- Use life skills in the study of extinction and protection of living organisms from extinction.
- Write a scientific report on the causes of extinction of some organisms.
- Continue and express their views and discuss with their colleagues and the teacher about ways to protect living organisms from extinction.
- Appreciate the greatness of God in the creation of living organisms.

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LESSON 1

# Fossils



**How** can you study live evolution on the planet Earth ?

*If you organize a trip to the Geological museum at the River Nile bank in Zahraa El Maady, you will observe the presence of fossils there.*

In this lesson, we will study :

- *Concept of fossils.*
- *Importance of fossils.*
- *Types of fossils and their formation.*

## Concept of fossils

- Fossils are considered as an exciting world (a story told by rocks), that tell us about the deep past, millions years ago even before the creation of man on the Earth.

**Fossils:**

They are traces and remains of old living organisms that are preserved in sedimentary rocks.

**- What is the meaning of traces and remains ?**

**Trace:**

Traces of an old living organism indicate its activity during its life.

**Examples :**

**Worms' tunnels**



**Dinosaur's foot print**





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Lesson One

## Remains:

Traces that indicate the remains of an old living organism after death.

## Examples :

**Remains of a shark's teeth**



**Remains of a dinosaur's skull**



### ▸ Enrichment information

- *In Latin, the word fossil means something buried in the Earth.*
- *The science, which studies fossils is called "Paleontology".*

## Types of fossils

**Fossils are classified according to the way of formation (or preservation) into several types, among them are :**

1. **Fossil of a complete body**
2. **Mold**
3. **Cast**
4. **Petrified fossils**

## 1 Fossil of a complete body :

- ***It is a type of fossils, which was formed as a result of the rapid burying of the organism as soon as it died in a medium that preserves it from decomposition as snow and amber.***
- It keeps the whole shape and all the details of the body.



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## Examples of a complete body fossil :

### A Mammoth fossil :

- Mammoth (a type of elephants) was extinct by the snow avalanche occurred in Siberia 25000 years ago.
- The **first mammoth fossil,** which was discovered last century, which keeps the whole shape, hair, flesh and food in its bowel.

**Way of formation :**

- When it died and rapidly buried in **snow**, its body didn't decompose.



Mammoth fossil

### B Amber fossil :

- During some old geologic ages, there were common ***pine trees***, which secreted **resinous matter** that covers insects.
- After the resinous matter solidifies, it changes into ***amber*** which preserves the bodies of insects inside it from decomposition (decaying).



Amber fossil

**Amber:**

It is the solidified resinous matter, which was secreted by pine trees in old geologic ages.

GR ***Amber is considered a suitable medium for the formation of complete body fossils.***
Because it preserves the bodies of insects inside it from decomposition.

## 2 Mold

**In the opposite figure :**

The face pattern that carries the internal details of a face mask is known as a mold.




A mold for a face mask



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Lesson One

*- Before studying the mold fossils, we must know how to make a model of a solid mold.*

## ACTIVITY 1 Making a model of a solid mold :

### Materials and tools :

- Plaster of paris.
- Water.
- Brush.
- Food oil.
- Plastic container.
- Metal mold (or a silicon mold).
- Rod for stirring.

| ⊙ Procedures | ⊙ Figure | ⊙ Observation |
|---|---|---|
| 1. Paint the internal surface of the metal mold with oil using the brush. |  | - The details formed on the surface of the plaster are the same details of the internal surface of the metal mold. |
| 2. Mix plaster of paris with water and continue stirring to make suitable mixture. | | |
| 3. Pour the mixture in the metal mold and wait until the plaster of paris solidifies. | | |
| 4. Separate the hard mixture from the metal mold. | | |

### Conclusion :

A replica of the internal shape of metal mold is formed and it is known as **"Solid mold"**.

### Solid mold fossil:

It is the replica of the internal details of the structure of an old living organism left after its death in sedimentary rocks.

### ➲ Examples of solid mold fossils :

**Ammonites fossil**



**Nummulites fossil**



**Trilobite fossil**





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UNIT 3

## How is the ammonites solid mold (mold of snail) formed ?

1. When a snail (or clam) dies, it falls on the sea floor, where its soft parts decompose leaving the shell which is buried in sediments.

2. The sediments fill up the shell cavities and solidify as the time passes.

3. The shell decomposes completely, leaving a solid rock mold carrying the internal details of the snail.

## Real Life application : A Candle mold



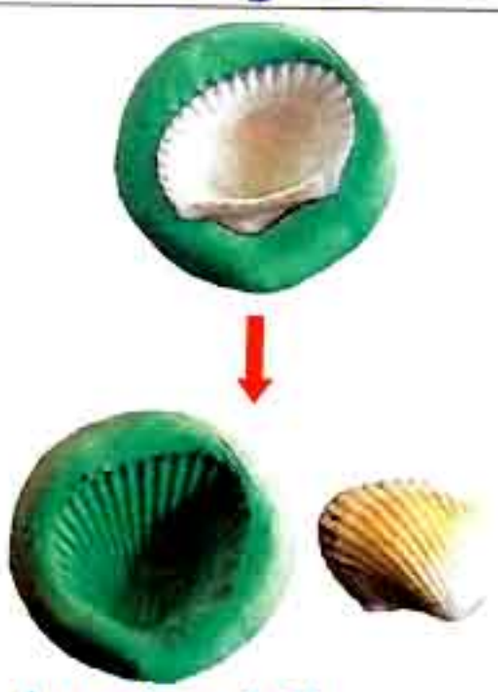
- Melt a piece of paraffin wax or wax remains in a water bath.
- Roll a piece of strong paper in the form of a cylinder, then put it in an empty yoghurt can, then pass a thick thread through the cylinder using a needle.
- Pour the melted wax in the cylinder keeping the thread in the middle all time.
- Remove the paper from around the wax after its solidification and put the candle in a suitable glass saucer.

## 3 Cast

*To know what is meant by cast, we must carry out the following activity :*

### ACTIVITY 2 Making a model of cast :

**Materials and tools :** • Coloured clay. • A shell of clam.

| ⊙ Procedures | ⊙ Figures | ⊙ Observation |
|---|---|---|
| 1. Press on the clay by your hand to make a plane surface. |  A cast for a shell | - The details formed on the clay are the same details of the external surface of shell. |
| 2. Put the shell on the surface of the clay and press it gently. | | |
| 3. Remove the shell from the clay. | | |

**Conclusion :**

A replica of the original external shell shape is formed and it is known as "**Cast**".



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Lesson One

## Cast fossil :

It is the replica of the external details of the structure of an old living organism left after its death in sedimentary rocks.

### ➲ Examples of cast fossils :

**Cast of ferns**



**Fish cast**



**Note**

In the sedimentary rocks, mold or cast can be formed for an old living organism after its death.




Trilobite fossil

### ➲ Comparison between a mold and a trace :

| Mold | Trace |
|---|---|
| - It is the replica of the internal details of the structure of an old living organism leaving them in the sedimentary rocks after death. | - Traces that indicate an activity of an old living organism leaving them in sedimentary rocks during its life. |
| **Ex.:** Ammonites mold fossil. | **Ex.:** Dinosaur's foot print. |

## Exercise 1

***Choose the correct term (cast - mold - trace) of each of the following fossils :***



1. Fossil ..... of ferns.



2. Fossil ..... of worms' tunnels.



3. Fossil ..... of trilobite.

**Answer**

**1.** cast **2.** trace **3.** mold



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UNIT 3

## 4 Petrified fossils :

### Petrified fossils:

They are fossils, in which minerals replace the organic matter of organism part by part leaving the shape without any change.

### ➲ Examples of petrified fossils :

**Dinosaur's tooth**



**Dinosaur's eggs**



**Petrified wood**



### ❋ How is the Petrified wood formed ?

**1.** The stems and trunks of trees that are more than 35 million years of age were buried in certain environmental conditions.

**2.** The silica replaced the wood material (organic matter) part by part, and this is known as **"Petrification"**.

**3.** By passing time, the wood changes into rocks, which carry the same details of wood without change.

* Although petrified woods look like rocks, they are considered as fossils, because they give us the details about the life of an old plant.

**Note**

The area of petrified forests in Qattamiya is called the **wood mountain** because it contains petrified woods, which look like rocks.

GR.

***Petrified woods are considered as fossils although they look like rocks.***

GR.

***Naming the petrified forest in Qattamiya with wood mountain.***



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Lesson One

## Petrified woods:

They are fossils, which are formed as a result of replacing the organic matter of wood with the silica part by part and they give us details about the life of an old plant.



## Petrification:

It is the process of replacing the wood material of trees by silica to form petrified woods part by part.

### ▸ Enrichment information

- *An Egyptian dinosaur has been discovered in Bahariya Oasis, Giza governorate and parts of it are being displayed in the Egyptian Geological Museum.*

## Suitable conditions for fossils formation (or preservation) :

**First**
Presence of hard skeleton of organism.

**Second**
The organism body must be buried immediately after death in a medium that preserves it from decomposition.

**Third**
The existence of a suitable medium, in which the mineral material replaces the organic material of the living organism.

**TRY** TO ANSWER worksheet in the Notebook 17

## Importance of fossils

**Fossils are important, because they help in :**

1. Age determination of sedimentary rocks
2. Figuring out the paleoenvironment
3. Studying life evolution
4. Petroleum exploration



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UNIT 3

## 1 Age determination of sedimentary rocks :

**Index fossils** indicate the age of sedimentary rocks GR.

**because the age of rocks is the same age of fossils existed in them.**

### Index fossils:

They are fossils of organisms that had lived for a short period of time in the past and had a wide geographic distribution, then became extinct.

### Note

**The scientists notice that :**

The lower layers of sedimentary rocks have fossils, whose relative age is greater than that of the fossils of the upper layers.

## 2 Figuring out the paleoenvironment :

Fossils give us an idea about the environment, in which they lived during the old geologic ages therefore they indicate the climate of these ages.

### Examples :

**Nummulites fossils :**

1 They are found in the limestone rocks of El-Mokattam mountain and they indicate that this area was a sea floor more than 35 million years ago.



**Ferns fossils :**

2 They indicate that the environment, where they lived was a hot and rainy tropical environment.



**Coral fossils :**

3 They indicate that the environment, where they lived was a clear warm shallow seas.





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## Exercise 2

***How can you infer from the presence of coral fossils in an area to know its past climate ?***

## Answer

The presence of coral fossils in an area indicates that this area was clear warm shallow seas.

## 3 Studying life evolution :

Life evolution is known by studying **fossil record**.

### Fossil record:

Fossils exist in the rocks of different areas that indicate the extinction and evolution of organisms.

### ➲ Importance of fossil record :

It indicates the extinction and evolution of organisms.

**The study of the fossil record showed that :**

1. Life started first in sea then established on land.
2. Organisms always developed from simple to complicated, as the following :

### A In plant world :

Algae **appeared before** Mosses and Ferns



Gymnosperms **appeared before** Angiosperms





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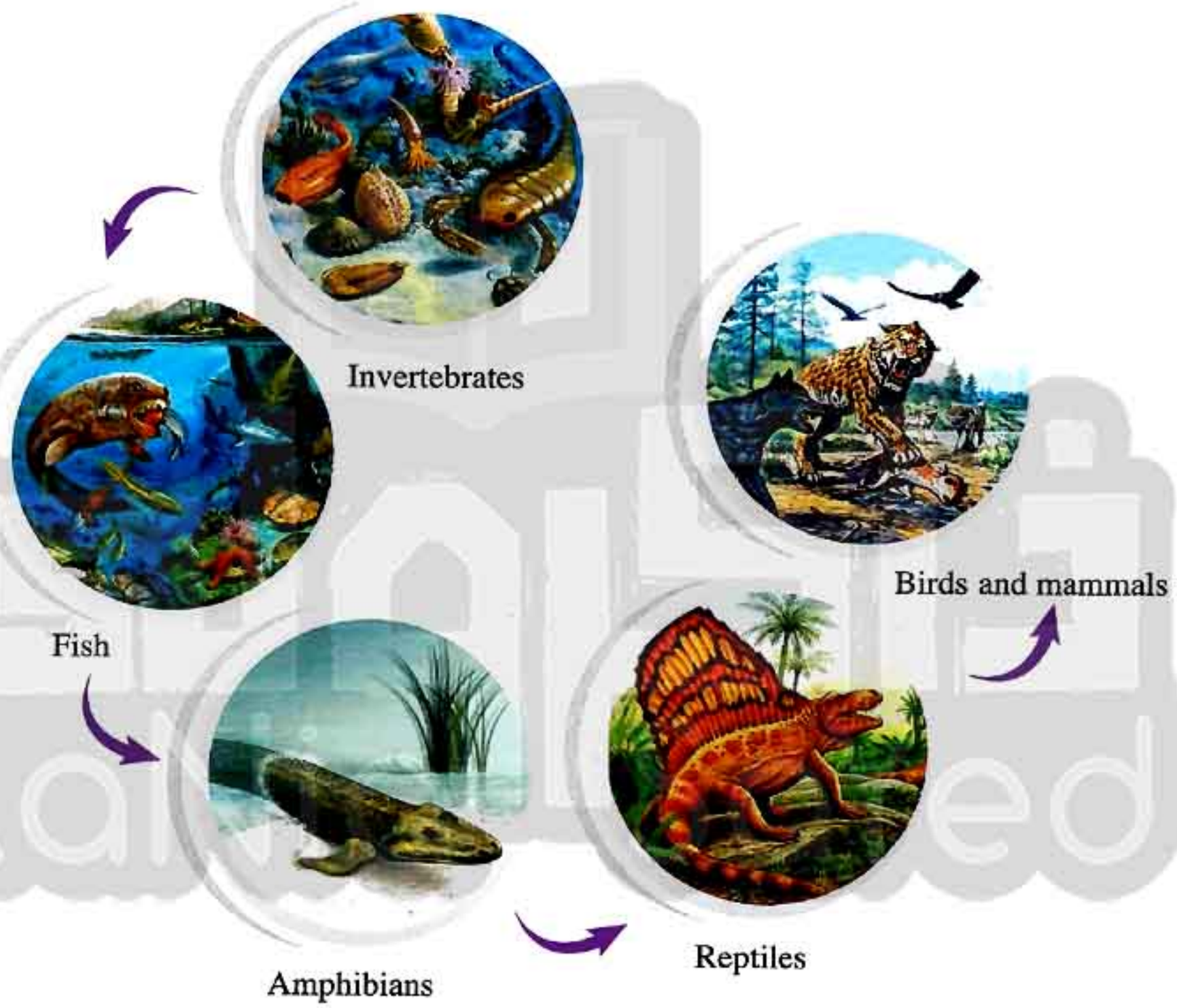
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UNIT 3

## B In animal world :

- **Invertebrates** like (corals and mollusks with shells) appeared before **Vertebrates**.
- **Fish** were the first vertebrates that appeared followed by **amphibians** then **reptiles** and finally, **birds and mammals** appeared together.

*** As the following figure :**




The evolution of life from simple to complicated

### Note

Archaeopteryx fossil is considered a link between reptiles and birds.



Archaeopteryx fossil



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## Exercise 3

***- Arrange the following fossils starting with first appearance on the life stage.***

**[Cast fossil of fish - Mammoth fossil - Trilobite fossil - Archaeopteryx]**

## Answer

- Trilobite ⟶ Cast fossil of fish ⟶ Archaeopteryx ⟶ Mammoth
- **Trilobite** is from invertebrates that appeared in seas.
- **Fish** were the first vertebrates.
- **Archaeopteryx** links between reptiles and birds which appeared after fish.
- **Mammoth** is from the mammals that appeared after reptiles.

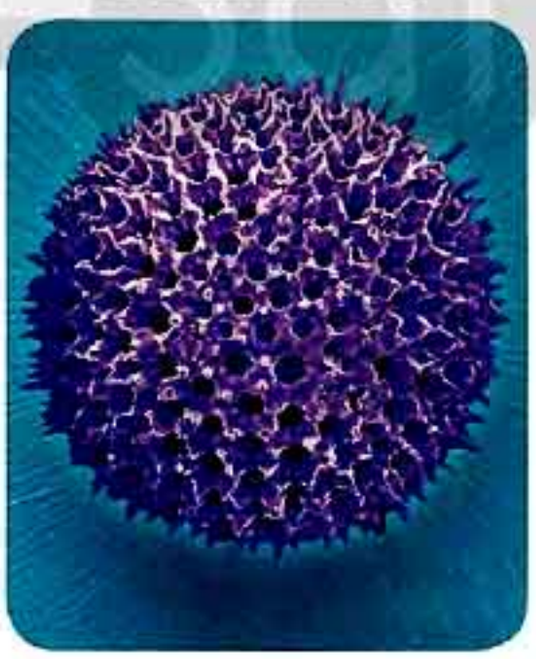
## 4 Petroleum exploration :

- When searching for petroleum, geologists take samples from the rocks of the exploratory wells.
- These samples are studied under microscope. If they contain microfossils like foraminifera and radiolaria, this could point to :
- The age of rocks existed in exploratory wells.
- The suitable conditions of petroleum formation.

**Radiolaria**



**Foraminifera**



TRY TO ANSWER worksheet in the Notebook 18



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### ✪ Fossils :

They are traces and remains of old living organisms that are preserved in sedimentary rocks.

### ✪ Trace :

Traces of an old living organism indicate its activity during its life.

**Examples :** Worm's tunnels – Dinosaur's foot print.

### ✪ Remains :

Traces that indicate the remains of an old living organism after death.

**Examples :** Remains of a shark's teeth-remains of a Dinosaur's skull.

### ✪ Types of fossils are :

(A) Fossil of a complete body as Mammoth fossil and amber fossil.

(B) Mold as Ammonites fossil, Nummulites fossil and Trilobite fossil (Solid mold fossils).

(C) Cast as cast of ferns and fish cast.

(D) Petrified fossils as petrified wood, Dinosaur's tooth and eggs.

### ✪ Fossils are important, because they help in :

(1) Age determination of sedimentary rocks.

**Index fossils :** They are fossils of organisms that had lived for a short period of time in the past and has a wide geographic distribution, then became extinct.

- Index fossils indictate the age of sedimentary rocks.

(2) Figuring out the paleoenvironment.

**Example :** Coral fossils indicate that the environment, where they lived, was clear warm shallow seas.

(3) Studing life evolution.

**Fossil record :** Fossils exist in the rocks of different areas that indicate the extinction and evolution of organisms.

- Archaeopteryx fossil is considered a link between reptiles and birds.

(4) Petroleum exploration.



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# Questions
## on lesson one



Questions signed by 📖 have been taken from the school book.

## 1. Choose the correct answer :

1. 📖 Fossils are found in ..... rocks.
   a. metamorphic  b. sedimentary  c. igneous  d. volcanic
2. Which of the following terms is more precise in describing the remains and traces of old living organisms that were preserved in sedimentary rocks ? .....
   a. Extinction.  b. The red list.  c. Fossils.  d. Petrification.
3. Worms' tunnels fossil is formed because of .....
   a. the presence of hard skeleton.
   b. the activity of worms during their life.
   c. the death of the worms themselves and quickly buried in sedimentary rocks.
   d. the death of the worms themselves and quickly buried in ice layers.
4. The complete body fossil of mammoth is found preserved in .....
   a. amber.  b. snow.  c. sedimentary rocks.  d. ocean.
5. 📖 Complete body fossils of insects are found preserved in .....
   a. ammonites.  b. amber.  c. igneous rocks.  d. ambergris.
6. Ammonite fossil represents a mold of a / an .....
   a. snail.  b. elephant.  c. insect.  d. scorpion.
7. On the solidification of the resinous matter secreted by pine trees in the old geological periods, it forms .....
   a. fossil of a complete body.  b. amber fossil.
   c. trilobite fossil.  d. nummulites fossil.
8. If you are a collector of shells of snails and clams on the beach of the sea. Which of the following can you make a model for a fossil known as a mold ? .....
   a. A shell of ammonites snail only.
   b. A shell of clam only.
   c. A shell of ammonites snail and clam together.
   d. These shells are not suitable for making a fossil.
9. What's the kind of fossil that is formed when a plant leaf falls on a soft sedimentary rock at the beginning of formation then hardening ? .....
   a. A trace.  b. A mold.  c. A cast.  d. A petrified fossil.
10. When mud fills up the shell cavities and solidify, then shell decomposes, ..... is produced.
    a. a solid mold  b. a cast  c. a petrified wood  d. no correct answer



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11. Is the cake considered as a solid mold, Why ? .....
    a. Yes, because it carries the same external details of the mold.
    b. Yes, because it carries the same internal details of the mold.
    c. No, because it carries the same internal and external details of the mold.
    d. No, because it doesn't carry any details of the mold.

12. To obtain a fossil of any organism, what do you expect to be available for it ? .....
    a. A hard skeleton.
    b. A medium protects it from decomposition.
    c. Fast burying after death.
    d. (a) , (b) and (c).

13. Fossils are important for all the following except .....
    a. determination of sedimentary rocks age.
    b. studying the kinds of metals.
    c. petroleum exploration.
    d. figuring out the paleoenvironment.

14. Are the dinosaur's eggs considered as examples of petrified fossils ? .....
    a. Yes, because minerals replace whose organic matter part by part.
    b. Yes, because they carry the internal details of the eggs.
    c. No, because they aren't considered as fossils.
    d. No, because they show the remains of dinosaur after its death.

15. What happened when silica replaced the wood of the trees' stems and trunks, which are older than 35 million years ? .....
    a. A complete body fossil has been formed.
    b. A petrified fossil has been formed.
    c. A trilobite fossil has been formed.
    d. A dinosaur tooth fossil has been formed.

16. ..... fossils are the fossils of organisms that had lived for a short period of time in the past and had a wide geographic distribution, then became extinct.
    a. Petrified  b. Index  c. Ferns  d. Coral

17. Not all the fossils are considered as index fossils and that is because they are characterized by .....
    a. long range of time and limited geographical range.
    b. short range of time and wide geographical range.
    c. long range of time and wide geographical range.
    d. short range of time and limited geographical range.

18. ..... fossils are found in the limestone rocks of El-Mokattam mountain.
    a. Ferns  b. Coral  c. Nummulites  d. Index



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19. ..... fossils indicate that the environment where they lived was a hot and rainy tropical environment.
a. Ferns b. Coral c. Nummulites d. Archaeopteryx

20. Life started first in .....
a. mountain tops. b. rivers. c. Earth. d. seas.

21. ..... is one of invertebrates that appeared in seas.
a. Mammoth b. Archaeopteryx
c. Fish d. Trilobite

22. The first vertebrate appeared on the Earth is/are .....
a. man. b. birds. c. fish. d. reptiles.

23. Archaeopteryx represents a link between .....
a. vertebrates and invertebrates. b. reptiles and birds.
c. fish and amphibians. d. amphibians and reptiles.

24. The fossil record points to the life evolution in plants from simple to complicated higher forms, and the evidence for that is .....
a. angiosperms preceded gymnosperms.
b. ferns preceded mosses.
c. algae preceded mosses and ferns.
d. mosses preceded ferns.

25. Which of the following is considered as the evolution of vertebrates ? .....
a. Fish ⟶ amphibians ⟶ mammals ⟶ reptiles.
b. Ferns ⟶ amphibians ⟶ reptiles ⟶ birds.
c. Fish ⟶ amphibians ⟶ birds ⟶ mammals.
d. Fish ⟶ amphibians ⟶ reptiles ⟶ mammals.

26. ..... is an example of microfossils.
a. Mammoth b. Ferns c. Foraminifera d. Archaeopteryx

27. Which of the following fossils play an important role in petroleum exploration ? .....
a. Foraminifera and radiolaria. b. Nummulites and ammonites.
c. Foraminifera and trilobite. d. Radiolaria and nummulites.

## 2. Choose from column (B) what suits it in column (A) :

(1)

| (A) | (B) |
|---|---|
| 1. Mammoth<br>2. Ammonites<br>3. Petrified wood | a. is a cast fossil.<br>b. is a mold fossil.<br>c. became extinct 25 thousands years ago.<br>d. is 150 million years in age.<br>e. is found in Qattamiya. |



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(2)

| (A) | (B) |
|---|---|
| 1. Corals | a. is a link between reptiles and birds. |
| 2. Ferns | b. is 400 million years of age. |
| 3. Nummulites | c. indicate the evolution from simple to complicated life. |
| 4. Archaeopteryx | d. are fossils that indicate that the environment where they lived was a hot and rainy tropical. |
| | e. are fossils that indicate that the environment, where they lived was a clear warm shallow seas. |
| | f. are fossils, whose age is more than 35 million years. |

## 3. Correct the underlined words :

1. The trace is what the living organism leave after its death in the sedimentary rocks.
2. The archaeopteryx fossil is a kind of extinct elephants.
3. 📖 The first discovered fossil of mammoth were found preserved in amber.
4. The resinous matter protects the insects inside it from decomposition.
5. Snail shell decomposes after the sediments fill its cavities, leaving a rocky cast carrying the internal details of the snail.
6. The mold is a copy of the outer shape of the shell.
7. The clam shell decomposes after the mineral sediments fill its pores leaving a rock mold of the inner surface details.
8. Petrified wood is considered as rocks.
9. Dinosaur's eggs and dinosaur's tooth are examples of cast fossils.
10. Nummulites fossils indicate the age of sedimentary rocks.
11. The ammonites fossil indicates that the environment, where it lived was a warm, clear and shallow seas.
12. Ammonites fossils are found in the limestone rocks of El-Mokattam's mountain.
13. 📖 Ferns fossils indicate that the environment where they lived was a sea floor.
14. The fossil record points to reptiles as the first appeared vertebrates.
15. Mammoth represents a link between reptiles and birds.
16. Archaeopteryx fossil is among invertebrates that appeared in seas.
17. Foraminifera and archaeopteryx are microfossils that are useful in petroleum exploration.

## 4. Write the scientific term of each of the following statements :

1. Traces and remains of old living organisms that are preserved in the sedimentary rocks.
2. Traces that indicate the activity of once an old living organism during its life.
3. Traces that indicate the remains of once an old living organism after death.
4. The process, in which old organisms were dead and fast burying in a medium that kept them from decomposition in a way keeping all of their details and body components.
5. The solidified resinous matter, which was secreted by pine trees during old geologic ages.



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6. A copy of the original internal details of a skeleton of an old living organism.
7. A replica of the external details of a skeleton of an old living organism.
8. • The fossils which are formed as a result of replacing the organic matter of wood by the silica part by part and they give us details about the life of once an old plant.
   • Fossils formed by the replacement of wood by silica part by part keeping its shape without change.
9. • 🕮 Replacing part by part, the wood material of trees by silica to form petrified wood.
   • The process of conversion of the parts of old living organisms to solidified materials as a result of replacing the organic material of the organism with minerals.
10. • Fossils of organisms that had lived for a short period of time in the past and had a wide geographic distribution.
    • 🕮 Remains of old organisms that lived in the past for a certain period, then became extinct.
11. The fossils that exist in the rocks of different areas that indicate the extinction and evolution of organisms.

## 5. Complete the following statements :

1. Fossils are traces and remains of ..... organisms that are preserved in ..... rocks.
2. ..... indicate the activity of an old living organism during its life, while ..... indicate the remains of once an old living organism after death.
3. ..... and ..... are examples of traces of an old living organism.
4. ..... and ..... are examples of remains of an old living organism after death.
5. The fossils types differ according to their way of .....
6. Fossils are classified according to the ways of formation into fossil of a complete body, ..... , ..... and .....
7. The suitable medium to form a mammoth fossil is .....
8. The mammoth fossil was discovered in the beginning of the ..... century and it was still keeping its .....
9. The complete body fossil of ..... animal was discovered in the ..... of Siberia and indicated that the animal lived 25000 years ago.
10. ..... trees secrete resinous matter, which changes into ..... after its solidification.
11. Resinous is secreted from ..... which were common during some ..... geological periods.
12. To obtain a complete body fossil of organism, it must be buried ..... as soon as it died in a medium protects it from .....
13. The ..... transforms after solidification into a substance known as amber, which preserves living organisms inside it from .....
14. ..... and ..... are examples of solid mold fossils.
15. ..... and ..... are examples of cast fossils.



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16. The replica of the internal details of a skeleton of once an old living organism is called ..... ,while that of the external details is called .....
17. When the snail's shell decomposes, it will leave ..... which carries the internal details of the snail.
18. ..... replaces wood material part by part in the ..... wood fossils.
19. In petrified fossils, minerals replace the ..... matter of organism part by part leaving the ..... without any change.
20. ..... and ..... are from examples of petrified fossils.
21. The area of petrified forests in Qattamiya is known as ..... because it contains ..... which look like rocks.
22. Fossils are important for studying ..... and figuring out the .....
23. ..... fossils indicate the age of ..... rocks.
24. There is ..... fossils in the ..... rocks, which form El-Mokattam's mountain.
25. Ferns fossils indicate that the environment, where they lived was ..... and rainy ..... environment.
26. Coral fossils indicate that the environment, where they lived was ..... warm and ..... seas.
27. By studying the fossil record, it shows that the ..... started first in ..... then established on .....
28. ..... had appeared before ferns, while gymnosperm appeared before ..... plants.
29. ..... were the first vertebrates that appeared and followed by .....
30. According to fossil record, ..... and mammals appeared together after the appearance of .....
31. The presence of fossils like radiolaria and foraminifera in the exploration wells' rocks indicate the ..... of these rocks and the suitable conditions to form .....
32. 📖 Archaeopteryx is the link between ..... and .....
33. 📖 Fossils are used in petroleum ..... and determining the age of .....

## 6. Give reasons for :

1. Mammoth fossil is preserved as a complete body fossil.
2. Amber is considered as a suitable medium for the formation of complete bodies fossils.
3. Ammonites fossil is classified as a mold fossil.
4. Formation of petrified woods fossils.
5. 📖 Naming the petrified forest in Qattamiya with wood mountain.
6. 📖 The petrified woods are considered as fossils although they look like rocks.
7. 📖 El-Mokattam mountain was a part of a sea floor more than 35 million years ago.
8. Nummulites fossils are considered as index fossils.



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9. Not all known fossils are considered as index fossils.
10. 📖 Importance of fossils in petroleum exploration.
11. Foraminifera and radiolaria have an important role in petroleum exploration.

## 7. What is meant by each of the following :

1. 📖 Fossils.
2. trace.
3. Remains.
4. A complete body fossil.
5. An amber.
6. A mold.
7. A cast.
8. Petrified fossils.
9. Petrified woods.
10. Petrification.
11. 📖 Index fossils.
12. A fossil record.

## 8. Mention an example of each of the following :

1. Trace fossil.
2. Fossil remains.
3. A fossil of complete body.
4. A fossil of cast.
5. A fossil of solid mold.
6. Petrified fossil.
7. Fossils are found in the limestone rocks of El-Mokattam mountain.
8. An organism represents a link between reptiles and birds.
9. Microfossils.

## 9. Mention the importance of each of the following :

1. Fossils.
2. Index fossils.
3. 📖 Nummulites fossils.
4. 📖 Coral fossils.
5. Ferns fossils.
6. Fossil record.
7. Foraminifera and radiolaria (or microfossils).

## 10. What is the difference between..... ?

1. Trace and remains.
2. The mammoth and amber fossils.
3. 📖 A cast and a mold.
4. A cast and a trace.
5. 📖 A mold and a trace.
6. Coral fossils and ferns fossils.
7. The importance of a nummulites fossil and a foraminifera fossil.

## 11. Choose the odd word out, then write the suitable name for others :

1. Cast - Fossil of complete body - Fossil record - Mold.
2. Trilobile fossil - Nummulites fossil - Fossil of ferns - Ammonites fossil.
3. Fossil of dinosaur's tooth - Fossil of dinosaur's eggs - Nummulites fossil - Fossil of petrified wood.
4. Figuring out the paleoenvironment - Petrified fossils - Studying life evolution - Petroleum exploration.

## 12. What are the consequences of each of the following :

1. An organism is buried fast after death in snow.
2. Dipping the old insects in amber.



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UNIT 3

3. The solidification of the mineral sediments inside the ammonites, then the decomposition of its shell over millions of years.
4. Putting a clam's shell on the surface of a flat piece of clay and pressing it gently.
5. Silica matter replaces wood material part by part of an old tree.

## 13. Mention the geological criteria that prove each of the following :

1. The area of El-Mokattam mountain was a sea floor more than 35 million years ago.
2. Evolution of living organisms towards complexity and higher ranking.
3. Environment was a clear warm and shallow seas.
4. Environment was a hot and rainy tropical.
5. Probability that there is petroleum in an area when examining samples from the rocks underground.

## 14. Variant questions :

(1) **"Paleontology is the science of studying fossils that tells us about the nature of the deep past before the creation of man".**
a. What is the concept of fossils ?
b. Mention the types of fossils.

(2) **"Amber preserves organisms in a complete shape without decomposition".**
a. How is amber produced ?
b. What is the type of organisms that is preserved in amber ?
c. Why do not living organisms bodies decompose when preserved in amber ?

(3) **Explain how the ammonites mold fossil is formed.**

(4) **"You and your classmates visited the petrified forest protectorate in Qattamiya and you have seen the petrified woods".**
a. What is the age of the trees that form these petrified woods ?
b. Are these petrified wood fossils or rocks ? Why ?
c. How were petrified woods formed ?

(5) **Mention the suitable conditions for fossils preservation.**

(6) **"Structure of organisms evolves from simple to complicated as the time passes".**
a. What is the last type of animals that appeared on the Earth ?
b. What is the type of vertebrate animals that appeared before reptiles ?
c. What is the name of the fossil that represents the link between reptiles and birds ?

(7) **"One researcher discovered microfossils like foraminifera and radiolaria when he investigated samples taken from the rocks of an exploratory well".**
What information can be concluded from this discovery ?

(8) **"Fossils indicate the paleoenvironments (past environments) where they lived throughout the old geologic ages, and hence the paleoclimate of these ages"**
Describe the environment where the following fossillized organisms lived :
a. Ferns. b. Coral. c. Nummulites.



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**(9) Arrange the following fossils according to first appearance on the life stage :**

Mammoth – Cast fossil of fish – Trilobite – Crocodiles.

**(10) 🕮 Which of the following represents a cast or a mold ?**

a. The mask of superman.
b. Wax museum statues in Helwan.
c. Cubes of ice.
d. Models of clothes shows.

## 15. Look at the following pictures, then answer the questions :

**(1) 🕮 Mention the name and the type of each fossil illustrated in the following figures :**



Fig. (1)



Fig. (2)



Fig. (3)



Fig. (4)



Fig. (5)



Fig. (6)

**(2) From the following fossils :**



Fig. (1)



Fig. (2)



Fig. (3)

A. Mention the type of fossils (1) and (3).

B. What is the thing which is in common between the fossils (2) and (3) ?

C. If the fossil number (1) is found in an area, it indicates that this area was .....
[Complete].



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**(3) From the following fossils :**

| | | |
|---|---|---|
|  Fig. (1) |  Fig. (2) |  Fig. (3) |

A. Mention the name of each of them.

B. What it indicated by the presence of fossil (1), (2) and (3) in an area ?

C. What is the area, in which fossil (3) is found ?






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**1.** Which of the following animals can form cast after its death ?


(A)


(B)


(C)


(D)

**2.** Can we consider dinosaur is a type of mammals ? (Give reasons)

**3.** What is the scientific explanation for the absence of trilobite fossil with a mammal animal fossil in one layer of rocks ?

**4.** Arrange the following living organisms in ascending order according to appearing on Earth : Frog, horse, shark, earth worm, snake.

**5.** We can't found old fossils between marble (a type of metamorphic rocks), Explain the reasons.

**6.** We can consider El-Mokattam mountain was a sea floor more than 35 million years ago, (Explain).



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LESSON 2

# Extinction



**Why**

are some animal species no longer exist on the planet Earth ?

***From your previous studies, you know that living organisms are always in case of equilibrium. The number of a certain kind of organisms does not exceed the number of another species. The continuous decrease in number of other species without compensation of this decrease in number causes the death of all individuals of this species which is known as extinction.***

## Extinction:

- It is the continuous decrease without compensation in the number of a certain species of living organisms until all members of species die out.
- It is dying out of all members of species of living organisms.

### ☆ Using fossils to indicate extinction :

You have known in the previous lesson that fossils of living organisms, which are left in the sedimentary rocks from millions years ago, are considered as a Fossil record, which indicates :

Ⓐ The types of living organisms which lived on Earth in different ages.

Ⓑ The types of extinct living organisms which lived on Earth in old ages like :
Dinosaur, archaeopteryx and many types of fish.



Dinosaur fossil



Archaeopteryx fossil



Fish fossil



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**▸ Enrichment information**

*Most dinosaurs became extinct by the end of Mesozoic Era (66 million years ago) due to environmental and climatic changes.*

## Reasons of extinction :

### A Reasons of extinction in old ages [macro extinctions] :

Many scientists attributed macro extinctions, when many living organisms lived on Earth exposed to like extinction of dinosaurs is due to occurrence of :

1. Meteorite impacts with Earth.
2. The violent Earth movements.
3. The onset of a long glacial age.
4. Emission of poisonous gases from active volcanoes.



Meteorite impacts with Earth causes extinction of dinosaurs

### B Reasons of extinction in recent ages :

- Recent extinction that is occurred now is caused by different factors. Most of them are due to the interference of man with nature such as :

**1 Destroying natural habitat**



Cutting forests of trees

**2 Overhunting**



Overhunting

**3 Environmental pollution.**



Death of marine bird due to oil pollution

**4 Climatic changes resulted from industrial activities of man and natural disasters.**



Drought



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UNIT 3

**For illustration**

*From disasters that are related to climatic changes are :*

- *Drought.*
- *Torrents*
- *Tornadoes*
- *Volcanoes*
- *Forests fires.*
- *High marine tide (Tsunami waves).*

## The extinct and endangered species :

## First The extinct species

### ➲ Examples of some extinct species in the old times :

- Hundred millions of organisms extincted in the old times. The most famous of them are :

**1 Dinosaur**

- Dinosaur became extinct from 66 million years ago.



**2 Mammoth**

- Mammoth is called the grand father of recent elephant



### ➲ Examples of some extinct species in the recent times :

**1 Dodo bird**

- It is a non-flying bird GR. **due to the reduced size of its wings so, it is an easy target for hunters.**



**2 Quagga**

- It is a mammal animal.
- It is considered the midway between horse and zebra.





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# Second The endangered species

## ➲ Examples of some endangered species:

- There are about 5000 endangered species like :

### 1 Panda bear



### 2 Rhinoceros



### 3 Ibis bird



### 4 Barbary sheep



### 5 Bald eagle

- It is called bald GR. **because its head is covered with white feathers.**



### 6 Papyrus plant

- It is used by pharaohs to manufacture writing papers.





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## Note

Ibis bird, barbary sheep and papyrus plant are considered from Egyptian environmental organisms.

TRY To Answer Worksheet 19 in the Notebook

## Effect of extinction on the ecological equilibrium

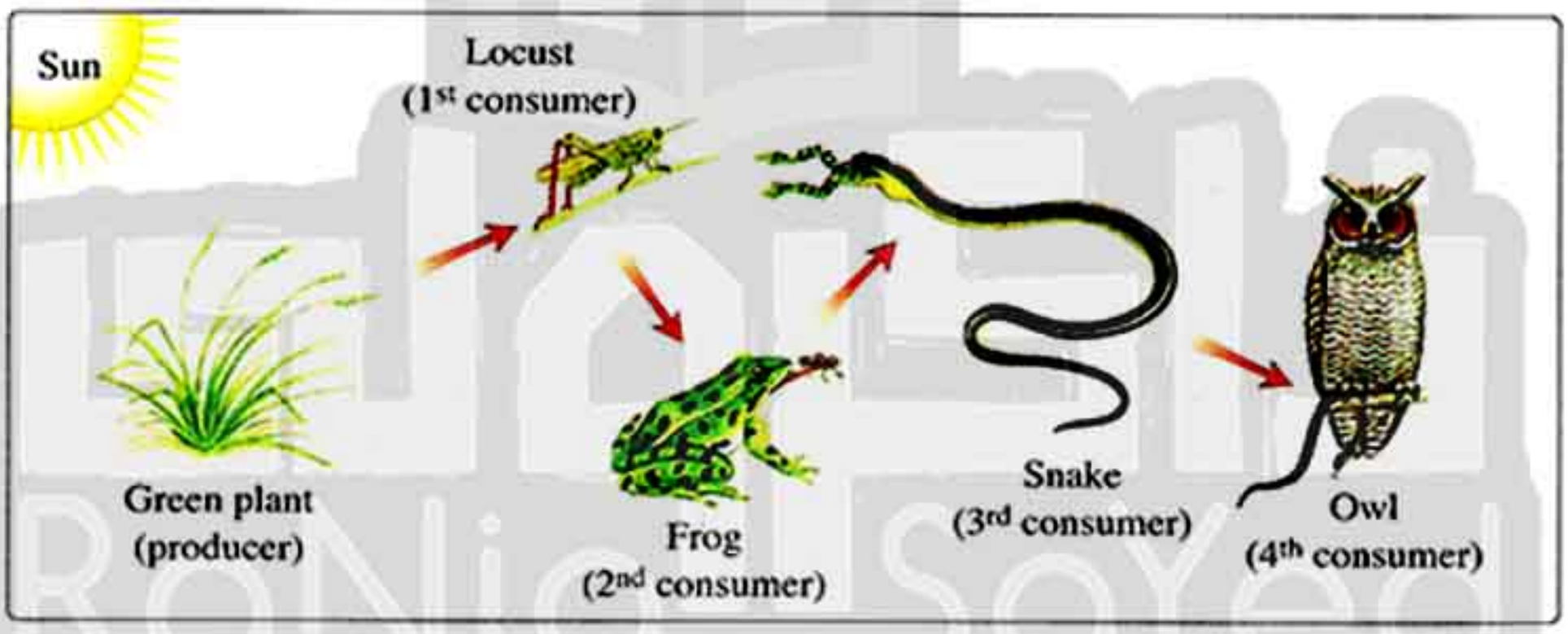
- At any ecosystem the energy transfers through a path which is known as **food chain.**

### Food chain:

It is a path of energy that transfers from a living organism to another in the ecosystem.

- Each living organism has a role in transferring energy throughout the food chain as energy transfers from producers to consumers.

**As in the following chain :**




- Groups of food chains are connected forming **food web.**

### Food web:

It is a group of food chains connected with each other.

- The system remains balanced unless one of its members is absent.
- When an organism disappears, its role stops, affecting the rest of members of the food chain or the food web.

## Exercise

***- The following figure shows a terrestial food chain :***

Green plant ⟹ Locusts ⟹ Frogs ⟹ Snakes ⟹ Owls



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Lesson Two

1. What happens in the absence of frogs ?
2. What happens in the absence of snakes ?

**Answer**

1. Snakes die due to starvation and the number of locusts will increase.
2. Owls die due to starvation, so the number of frogs will increase and pounce on the locusts.

"In the two cases, there is a disturbance in the ecosystem"

## What are the consequences of ... ?

**Extinction of species or a group of species from a balanced ecosystem.**

➲ It causes a cavity (cut link) in the path of energy in the ecosystem that would disturb the ecosystem equilibrium or destroy it.

• **Ecosystem is classified according to the degree of the effect of extinction on it into :**

**1 Simple ecosystem**

**Simple ecosystem:**

It is an ecosystem that has a few members and it is strongly affected by the absence of one of its species.

**Characteristics**

- It is characterized by containing a few number of members of living organisms **(few members).**
- It is strongly affected by the absence of one of its species GR. **Because of the rarity of alternative that compensates this absence.**

**2 Complicated ecosystem**

**Complicated ecosystem:**

It is an ecosystem that has multiple members and it is not affected much by the absence of one of its species.

**Characteristics**

- It is characterized by containing a large number of members of living organisms **(multiple members).**
- It is not affected much by the absence of one of its species GR. **Because it has many alternatives.**

**Examples**

• **Desert.**



• **Tropical forest.**





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*** Ways to protect rare and endangered living organisms :**

1. Rearing and reproducing the endangered species and sending them back to their native habitats.
2. Establishing gene banks for the endangered species.
3. Establishing natural protectorates areas.
4. Issuing legislations and rules to organize and control hunting in land, sea and air especially for the rare types.
5. Increasing awareness about the importance of natural life to sustain the existence of mankind.

## Natural protectorates:

They are safe areas established to protect endangered species in their homeland.

*** Importance of natural protectorates :**

Natural protectorates provide the endangered species with suitable conditions for growth and reproduction away from their natural enemies.

### ➲ The important world's protectorates :

| Protectorate | Location | Protected kinds |
|---|---|---|
| **1. Bluestone protectorate :** | USA | Grey bear  |
| **2. Panda protectorate :** | Northeastern China. | Panda bear  |



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Lesson Two

## ➲ The important Egypt's protectorates :

| Protectorate | Location | Protected kinds |
|---|---|---|
| **1. Ras Mohamed protectorate :** It is the first established protectorate in Egypt in 1983. | South Sinai governorate. | Rare species of coral reefs and coloured fish  |
| **2. Wadi Hetan ( part of Wadi El-Raiyan protectorate) :** | El-Fayoum governorate. | Complete whales' skeletons fossils (40 million years ago).  |

GR. ***Wadi Hetan (part of Wadi El-Raiyan protectorate in El-Fayoum) is considered the most important area in this protectorate.***

Because it contains complete whales' fossils 40 million years ago.



**Note**

- Ras Mohamed protectorate (shaped as a chin)

**▸ Enrichment information :**

*Number of natural protectorates that had been established according to the law (number 102 year 1983) about 30 natural protectorates till 2012 which found on about 15 % of the total area of Egypt.*

**TRY** TO ANSWER worksheet 20
- General Exercise of the School Book on Unit 3
- Model Exams on Unit 3

in the Notebook



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**Extinction :**

It is continuous decrease without compensation in the number of a certain species of living organisms until all members of species die out.

(or)

It is dying out of all members of species of living organisms.

**Among factors causing old (or macro) extinctions are :**

1. Meteorite impacts with Earth.
2. The onset of along glacial ago.
3. Emission of poisonous gases from active volcanoes.

**Among factors causing recent extinction are :**

1. Destroying natural habitat.
2. Overhunting.
3. Environmental pollution.
4. Climatic changes and natural disasters.

**Among examples of some extinct species in the old times are :**

Dinosaur and Mammoth.

**Among examples of some extinct species in the recent times are :**

Dodo bird and Quagga.

**Among examples of some endangered species are :**

Panda bear – Rhinoceros – Bald eagle – Ibis bird - Papyrus plant and Barbary sheep.

**Food chain :**

It is a path of energy that transmits from a living organism to another in the ecosystem.

**Food web :**

It is a group of food chains connected with each other.

Ecosystem is classified according to the degree of the effect of extinction on it into

(A) Simple ecosystem. (B) Complicated ecosystem.

**Natural protectorates :**

They are safe areas established to protect the endangered species in their homeland.

Ex.: Bluestone protectorate, Panda protectorate, Ras Mohamed protectorate and Wadi El- Raiyan protectorate.



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## 1. Choose the correct answer :

1. Which of the following statements is more precise in describing the concept of extinction ? .....
   a. The date of death of the last individual of the same species.
   b. The continuous decrease in the numbers of individuals of the same species without compensation.
   c. Everything involves the living organisms and non-living things in a certain environment.
   d. The path that energy takes when it is transported from a living organism to another living organism in the environmental ecosystem.
2. 📖 ..... indicate(s) extinction.
   a. Fossils  b. Protectorates  c. Evolution  d. Ecological equilibrium
3. ..... is/are from the hypothetical theories that explain the causes of macro extinction.
   a. Meteorite impacts with Earth  b. Poisonous gases emitted by volcanoes
   c. Occurrence of long glacial age  d. All the previous answers
4. 📖 ..... is (are) of the most important causes of extinction in recent ages.
   a. Volcanic eruption  b. Falling of ice bergs
   c. Falling of meteorites  d. Overhunting and environmental pollution
5. ..... were famous extinct animals in old times.
   a. Dodo bird and mammoth  b. Dinosaurs and quagga
   c. Dinosaurs and mammoth  d. Grey bear and passenger pigeon
6. From the most common recently extinct species is/are .....
   a. dodo bird.  b. quagga.
   c. bald eagle.  d. (a) and (b) are correct.
7. ..... is considered the midway between horse and zebra.
   a. Quagga  b. Dodo bird  c. Golden frog  d. Tasmanian cat
8. ..... is an extinct bird, which was characterized by the reduced size of its wings.
   a. Passenger pigeon  b. Dodo bird  c. Bald eagle  d. Ibis bird
9. 📖 All of the following are endangered species except .....
   a. panda bear.  b. bald eagle.  c. quagga.  d. rhinoceros.



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UNIT 3

10. ..... is the path of energy that transmits from a living organism to another.
a. Food type b. Food pyramid c. Food chain d. No correct answer

11. 📖 ..... protectorate is the first established natural protectorate in Egypt.
a. Saint Cathrine b. Ras Mohamed c. Wadi Hetan d. Petrified forest

12. Bluestone protectorate, which was established for grey bear is in .....
a. China. b. USA. c. Wadi Hetan. d. Ras Mohamed.

13. Ras Mohamed protectorate includes .....
a. some rare fish. b. whales' fossils.
c. rare coral reefs. d. (a) & (c) are correct.

14. The age of whales' fossils in Wadi El-Raiyan is ..... million years.
a. 20 b. 40 c. 60 d. 68

## 2. Choose from column (B) what suits it in column (A) :

| (A) | (B) |
|---|---|
| 1. Dodo bird<br>2. Mammoth<br>3. Quagga<br>4. Dinasour | a. Its first fossil was discovered in Siberia<br>b. It is considered the midway between horse and zebra.<br>c. It became extinct from 66 million years ago.<br>d. It is a non-flying bird.<br>e. It looks like bald. |

## 3. Choose from columns (B) & (C) what suits it in column (A) :

| (A) | (B) | (C) |
|---|---|---|
| 1. Ras Mohamed<br>2. Wadi El-Raiyan<br>3. Bluestone<br>4. Panda | a. Panda bear<br>b. Grey bear<br>c. Rare coloured fish<br>d. Barbary sheep<br>e. Whales' fossils | A. USA<br>B. South Sinai<br>C. Fayoum<br>D. Sidney<br>E. Northeast China |

## 4. Put (✓) or (x) , then correct the wrong ones :

1. Protectorates indicate the extinction of species of living organisms. ( )
2. Dodo bird and quagga are from extinct species in the recent times. ( )
3. Papyrus is considered as an extinct plant. ( )
4. Tropical forest is an example of complicated ecosystem. ( )
5. Establishing gene banks and natural protectorate areas are ways to protect living organisms from extinction. ( )



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6. Ras Mohamed protectorate is the first established protectorate in Egypt in 1983. ( )
7. Bluestone protectorate is found in northeastern China. ( )

## 5. Correct the following statements without changing the underlined phrases :

1. Destroying the habitat is one of the factors that contribute to species adaptation.
2. Quagga became extinct from 66 million years ago.
3. Dodo bird has large size wings.
4. Ibis bird look like bald.

## 6. Write the scientific term of each of the following statements :

1. • The continuous decrease in the number of the same species of a living organism, without compensation, until they all die out.
   • The death of all members of species of living organisms.
2. A bird is characterized by small wings and it is a non-flying bird.
3. A mammal that has a shape midway between a horse and a zebra.
4. A bird which looks like bald.
5. An aquatic plant used by pharaohs to manufacture writing paper.
6. The environmental system, that is affected severely by the absence of one species of living organisms that live in it.
7. The environmental system, that is not affected severely by the absence of one species of living organisms that live in it.
8. The path the energy takes when it is transported from a living organism to another one inside the environmental system.
9. A group of food chains connected with each other.
10. Safe places that are specified to protect the endangered species in their original inhabitant.
11. A protectorate in the USA is established to protect the grey bear from extinction.
12. The first protectorate that has been established in Egypt and it is characterized by rare coral reefs and coloured fish.
13. The place which contains whales' skeletons and complete whales' fossils.

## 7. Complete the following statements :

1. Extinction is the continuous decrease in ..... of ..... species of living organisms without ..... until all the individuals of the species .....
2. ..... indicate the extinction of species of living organisms.
3. The fossils in rocks of different areas, which are known as ..... indicate the extinction of species of once living organisms. Most of them have ..... and became ..... before the creation of man.
4. ..... and ..... are from the causes of old extinction phenomenon.
5. ..... , ..... and ..... are among the causes of recent extinction.
6. From the extinct animals in the old ages are ..... and .....



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Unit 3

9. ..... is an example of endangered plants in Egypt, which is used by pharaohs in manufacturing of .....
10. Each living organism has a role in transferring ..... in the path of the ..... chain.
11. ..... is an example of the simple ecosystem, while ..... is an example of the complicated ecosystem.
12. ..... and ..... are among the ways that protect living organisms from extinction.
13. ..... is considered among the safe places that has endangered species.
14. ..... , ..... and ..... are considered the important world's protectorates.
15. ..... is the most important protectorate in the USA, which was established to protect .....
16. ..... is the first established protectorate in Egypt.
17. ..... is the place which contains whales' skeletons.

## 8. Give reasons for :

1. • Occurrence of macro extinctions for many living organisms.
   • Extinction of dinosaurs.
2. Occurrence of recent extinction.
3. Dodo bird was an easy target for hunters.
4. Naming the bald eagle by this name.
5. 🕮 The simple ecosystem is significantly affected by the absence of one of its species.
6. 🕮 Desert ecosystem is significantly affected by the absence of one of its species.
7. Tropical forest is a complicated ecosystem.
8. It is important to reproduce the endangered species and send them back to their native habitats.
9. Scientists attempt to establish a gene bank for some types of living organisms.
10. Some governments are interested in establishing natural protectorate areas.
11. Bluestone is an important natural protectorate.
12. World organizations are interested in studying the environment of Ras Mohamed protectorate.
13. Wadi El-Hetan is considered the most important area in Wadi El-Raiyan protectorate.

## 9. What is meant by ... ?

1. Extinction.
2. Food chain.
3. Food web.
4. Simple ecosystem.
5. Complicated ecosystem.
6. 🕮 Natural protectorates.



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**10. Mention one example of :**

1. Extinct bird.
2. Endangered bird.
3. Endangered plant.
4. Animal became extinct 66 million years ago.
5. A simple ecosystem.
6. A complicated ecosystem.
7. A natural protectorate.

**11. Mention the causes of each of the following :**

1. The extinction in old ages [macro extinction].
2. The recent extinction.

**12. Name the organism that is indicated by each of the following statements :**

1. A bird with small wings.
2. A mammal that has a shape midway between a horse and a zebra.
3. An animal, whose bluestone protectorate has been established for it.
4. A type of organisms that is being protected in Ras Mohamed protectorate.
5. An organism, whose complete fossils are found in Wadi El-Raiyan protectorate.

**13. Compare between :**

1. Old extinction and recent extinction [concerning : its causes].
2. Simple ecosystem and complicated ecosystem.

**14. What are the consequences of each of the following ?**

1. Extinction of a species from a balanced ecosystem.
2. The absence of one type of species from the simple ecosystem.

**15. Exclude the unsuitable word and mention what the rest has in common :**

1. Long glacial ages / A meteorite hits Earth / Destroying habitat / Volcanoes.
2. Rhinoceros / Panda bear / Quagga / Bald eagle.
3. Quagga / Dodo bird / Mammoth / Bald eagle.
4. Ras Mohamed / Bluestone / Wadi El-Raiyan / Giza pyramids area.

**16. Variant questions :**

(1) **"Dinosaur is one of the famous extinct animals"**

What are the factors postulated by scientists that caused the extinction of this animal ?

(2) **Mention the most important factors that cause species extinction.**

(3) **Mention three ways to protect living organisms from extinction.**



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**(6) Mention one difference between :**

a. Complicated and simple ecosystems.

b. The benefits (or characteristics) of Ras Mohamed protectorate and Wadi Hetan area.

**(7) Explain the effect of extinction of a species of living organisms on :**

a. simple ecosystem.

b. complicated ecosystem.

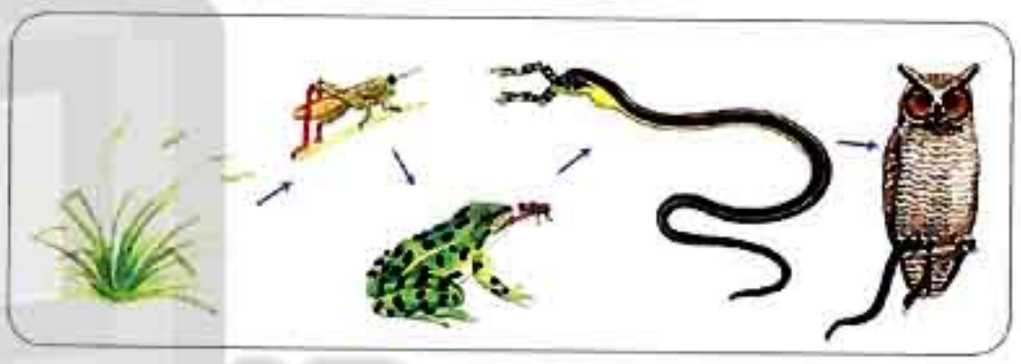
## 17. Study the following figures, then answer the questions :

**(1) "The opposite figure represents a food chain" – What would happen if :**

a. Green plant disappeared ?

b. Owl disappeared ?

c. Snake disappeared ?



**(2) "The opposite figure represents two different ecosystems" :**

a. Which one has multiple species ?

b. Which one is able to sustain its equilibrium and continuity of its food chain when one species disappears and why ?



Fig. (1)



Fig. (2)

**(3) From the opposite figure :**

a. What is the organism which is indicated by this figure ?

b. How it indicates the idea of extinction and evolution ?





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**(4) From the opposite figure :**

a. What is the ogranism which is indicated by this figure ?

b. Is it extinct or endangered animal ? (Give a reason).



**(5) 🕮 Look at the pictures of these land animals. Mention the name of each one and classify it as extinct or endangered.**



(1)



(2)



(3)

RaNia SaYed



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**1.** Do you expect that dodo bird lived on land or on tree ? Why ?

**2.** From the opposite figure :



a. Which living organism is absent from the food chain ?

b. What is the effect of your answer on the ecosystem of this chain and for the number of frogs ?

**3.** In the opposite figure :

If we cut the trees of the forest, what happens to ... ? :

a. Living organisms inhibit the forest.

b. The quantities of $O_2$ and $CO_2$ in the surrounding air.



**4.** What does this number indicates 5000 species ?



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# Glossary



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## Glossary

### Unit 1

#### Lesson 1

| | |
|---|---|
| Periodicity | دورية |
| Attempts | محاولات |
| Relationship | علاقة |
| Periodic table | جدول دورى |
| Atomic weight | الوزن الذرى |
| Vertical columns | أعمدة رأسية |
| Groups | مجموعات |
| Horizontal rows | صفوف أفقية |
| Periods | دورات |
| Ascending order | ترتيب تصاعدى |
| Gaps | فراغات |
| Isotops | نظائر |
| X-rays | الأشعة السينية |
| Atomic number | العدد الذرى |
| Preceding | يسبق |
| Inert gases | غازات خاملة |
| Specified | خصص |
| Subgroups | مجموعات فرعية |
| Heaviest | الأثقل |
| Sublevels | مدارات فرعية |
| Artificially | صناعيًا |
| Blocks | فئات |
| Transition elements | عناصر انتقالية |

#### Lesson 2

| | |
|---|---|
| Graduation | تدرج |
| Atomic size | الحجم الذرى |
| Attraction force | قوة الجذب |
| Electronegativity | السالبية الكهربية |
| Covalent bond | رابطة تساهمية |
| Polar compounds | مركبات قطبية |
| Metals | فلزات |
| Nonmetals | لافلزات |
| Metalloids | أشباه فلزات |
| Positive ion (cation) | أيون موجب |
| Electronic configuration | التوزيع الإلكترونى |
| Metallic | فلزى |
| Nonmetallic | لافلزى |
| Negative ion (anion) | أيون سالب |
| Metallic property | الخاصية الفلزية |
| Nonmetallic property | الخاصية اللافلزية |
| Dilute | مخفف |
| Bubbles | فقاعات |
| Litmus solution | محلول عباد الشمس |
| Basic oxides | أكاسيد قاعدية |
| Alkalis | قلويات |
| Chemical activity series | متسلسلة النشاط الكيميائى |
| Coal | فحم |
| Burning spoon | معلقة احتراق |
| Acidic oxides | أكاسيد حامضية |
| Acids | أحماض |
| Amphoteric oxides | أكاسيد مترددة |

#### Lesson 3

| | |
|---|---|
| Alkali metals | فلزات الأقلاء |
| Alkaline solutions | محاليل قلوية |
| Monovalent | احادى التكافؤ |
| Valency | تكافؤ |
| Pop sound | صوت فرقعة |
| Wrap | لف |
| Filter paper | ورقة ترشيح |
| Instantly | لحظيًا |
| Paraffin oil | زيت بارافين |
| Halogens | هالوچينات |
| Volatile | متطاير |
| Diatomic | ثنائية الذرة |
| Artificially | صناعيًا |
| Nuclear reactor | مفاعل نووى |
| Radioactive | مشع |
| Radiates (emits) | يشع |
| Gamma rays | أشعة جاما |
| Slides | شرائح |
| Liquified nitrogen | نيتروچين مسال |
| Cornea of eye | قرنية العين |

#### Lesson 4

| | |
|---|---|
| Agricultural fields | مجالات زراعية |
| Industrial fields | مجالات صناعية |
| Personal fields | مجالات شخصية |
| Single covalent bond | رابطة تساهمية احادية |
| Hydrogen bond | رابطة هيدروچينية |
| Polar solvent | مذيب قطبى |
| Aquatic creatures | أحياء مائية |
| Neutral | متعادل |
| Electrolysis | تحليل كهربى |
| Negative pole | القطب السالب |
| Positive pole | القطب الموجب |
| Glowing splint | شظية مشتعلة |



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## Glossary

| | |
|---|---|
| Acidified water | ماء محمض |
| Hofmann's voltameter | ڤولتامتر هوفمان |
| Pollution | تلوث |
| Natural pollutants | ملوثات طبيعية |
| Artificial pollutants | ملوثات صناعية |
| Volcanic eruptions | انفجارات بركانية |
| Lightning | برق |
| Thunder storms | عواصف رعدية |
| Biological pollution | تلوث بيولوچى |
| Hepatitis | التهاب كبدى وبائى |
| Bilharzia | بلهارسيا |
| Chemical pollution | تلوث كيميائى |
| Discharging | تصريف |
| Residues | بقايا |
| Concentration | تركيز |
| Blindness | عمى |
| Infection rate | معدل الاصابة |
| Liver cancer | سرطان الكبد |
| Thermal pollution | تلوث حرارى |
| Radiant pollution | تلوث اشعاعى |
| Dumping | القاء |
| Leakage | تسرب |
| Developing | تطوير |
| Water purification stations | محطات تنقية المياه |
| Disinfection | تعقيم |

## Unit 2

### Lesson 1

| | |
|---|---|
| Atmospheric layers | طبقات الغلاف الجوى |
| Atmospheric pressure | الضغط الجوى |
| Gaseous envelope | غلاف غازى |
| Atmospheric air | الهواء الجوى |
| Atmospheric envelope | الغلاف الجوى |
| Normal atmospheric pressure | الضغط الجوى المعتاد |
| Height above sea level | الارتفاع عن سطح البحر |
| Elevation (altitude) | ارتفاع |
| Length of air column | طول عمود الهواء |
| Mass of atmospheric air | كتلة الهواء الجوى |
| Density | كثافة |
| Instruments | أجهزة |
| Day weather | طقس اليوم |
| Aeroplanes | الطائرات |
| Atmospheric pressure maps | خرائط الضغط الجوى |
| Curved lines | خطوط منحنية |
| Low atmospheric pressure areas | مناطق الضغط الجوى المنخفض |
| High atmospheric pressure areas | مناطق الضغط الجوى المرتفع |
| Atmospheric turbulences | اضطرابات فى الغلاف الجوى |
| Characteristics | مميزات |
| Thickness | سمك |
| Atmospheric phenomenon | ظاهرة جوية |
| Organize | ينظم |
| Vertical | رأسى |
| Horizontal | أفقى |
| Air currents | تيارات الهواء |
| Inhabited areas | مناطق مأهولة |
| Foundations | أصول (أسس) |
| Susceptible | قابل للتأثير |
| Erosion | تآكل |
| Deposition | ترسيب |
| Agriculture | زراعة |
| Gradually | تدريجية |
| Absorption | امتصاص |
| Ultraviolet rays | الأشعة فوق البنفسجية |
| Ozone layer | طبقة الأوزون |
| Ozonic atmospheric envelope | الغلاف الجوى الأوزونى |
| Convenient | ملائم / مناسب |
| Meteors | شهب |
| Luminous | مضئ |
| Vacuumed (highly rarefied) | مخلخل أو مفرغ |
| Friction | احتكاك |
| Limited quantities | كميات محدودة |
| Thermal layer | طبقة حرارية |
| Wireless communications | اتصالات لاسلكية |
| Broadcasting | البث الاذاعى |
| Radio waves | أمواج الراديو |
| Radio stations | محطات الاذاعة |
| Communication centres | مراكز الاتصالات |
| Charged ions | أيونات مشحونة |
| Magnetic belts | أحزمة مغناطيسية |
| Van-Allen belts | حزامى فان آلين |
| Cosmic radiations | الأشعة الكونية |
| Aurora phenomenon | ظاهرة الشفق القطبى |
| Brightly coloured light curtains | ستائر خفيفة لامعة اللون |
| Outer space | الفضاء الخارجى |
| Satellites | أقمار صناعية |



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## Glossary

### Lesson 2

| | |
|---|---|
| Erosion of ozone layer | تآكل طبقة الأوزون |
| Global warming phenomenon | ظاهرة الأحترار العالمى |
| Greenhouse effect | ظاهرة الاحتباس الحرارى (أثر الصوبة الزجاجية) |
| Postulate | يفترض |
| Standard temperature and normal pressure | معدل الضغط ودرجة الحرارة |
| Dobson units | وحدات دوبسون |
| Degree of ozone layer | درجة طبقة الأوزون |
| Near ultraviolet rays (UVA) | الآشعة الفوق بنفسجية القريبة |
| Medium ultraviolet rays (UVB) | الآشعة الفوق بنفسجية المتوسطة |
| Far ultraviolet rays (UVC) | الآشعة الفوق بنفسجية البعيدة |
| Penetrate | يخترق |
| Protective shield | غلاف حماية |
| Chemical effect | تأثير كيميائى |
| Ozone hole | ثقب الأوزون |
| Pollutants | ملوثات |
| Chlorofluorocarbon compounds | مركبات الكلوروفلوروكربون |
| Commercially | تجاريًا |
| Cooling substance | مادة مبردة |
| Air conditioning sets | أجهزة تكييف الهواء |
| Propellant substance | مادة دافعة |
| Flating substance | مادة نافخة |
| Foam backing | دعامة من الفوم |
| Solvent substance | مادة مذيبة |
| Electric circuits slides | شرائح دوائر كهربية |
| Agricultural crops | محاصيل زراعية |
| Fire extinguishers | طفايات الحريق |
| Ultrasound airplanes (concorde) | طائرات تفوق سرعتها سرعة الصوت |
| Intergovernmental Panel on Climate Change | الهيئة العالمية للتغيرات المناخية |
| United nations | الأمم المتحدة |
| Concentration | تركيز |
| Cutting trees | قطع الأشجار |
| Forests fires | حرائق الغابات |
| Greenhouse gases | الغازات الدفيئة |
| Interpretation | ترجمة/تفسير |
| Permit | يسمح |
| Absorb | يمتص |
| Infrared radiations | الأشعة تحت الحمراء |
| Negative effects | أثار سلبية |
| Melting of polar ice | انصهار جليد القطبين |
| Threats | تهديدات |
| Coastal areas | مناطق ساحلية |
| Polar bear | الدب القطبى |
| Seal | فيل البحر |
| Melting of snow masses | انصهار كتل جليدية |
| Floods | سيول |
| Drought waves | أمواج الحفاف |

## Unit 3

### Lesson 1

| | |
|---|---|
| Fossils | حفريات |
| Traces | أثار |
| Remains | بقايا |
| Old living organisms | كائنات حية قديمة |
| Preserve | يحفظ |
| Sedimentary rocks | صخور رسوبية |
| Worms' tunnels | أنفاق ديدان |
| Dinosaur's foot print | أثر قدم ديناصور |
| Shark's teeth | أسنان قرش |
| Dinosaur's skull | جمجمة ديناصور |
| Fossil of complete body | حفرية كائن كامل |
| Mold | قالب |
| Cast | طابع |
| Petrified fossils | حفريات متحجرة |
| Petrified woods | أخشاب متحجرة |
| Amber | كهرمان |
| Old geologic ages | عصور جيولوچية قديمة |
| Resinous matter | مادة صمغية |
| Decomposition | تحلل |
| Solid mold | قالب مصمت |
| Plaster | شريط لاصق |
| Replica | نسخة طبق الأصل |
| Soft parts | أجزاء رخوة |
| Sediments | رواسب |
| Clay | صلصال |
| Plane surface | سطح مستوى |
| Cast of ferns | طابع من السرخسيات |
| Fish cast | طابع سمكة |
| Minerals | أملاح معدنية |
| Dinosaur's eggs | بيض ديناصور |
| Environmental conditions | ظروف بيئية |



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Glossary

| | |
|---|---|
| Petrification | التحجر |
| Petrified forests | غابات متحجرة |
| Organic matter | مادة عضوية |
| Hard skeleton | هيكل صلب |
| Importance | أهمية |
| Age determination of sedimentary rocks | تحديد عمر الصخور الرسوبية |
| Figuring out the paleoenvironment | الاستدلال على البيئات القديمة |
| Studying life evolution | دراسة تطور الحياة |
| Petroleum exploration | التنقيب عن البترول |
| Index fossils | حفريات مرشدة |
| Wide geographic distribution | مدى جغرافى واسع |
| Ferns fossils | حفريات السرخسيات |
| Coral fossils | حفريات المرجان |
| Limestone rocks | صخور الأحجار الجيرية |
| Fossil record | سجل حفرى |
| Extinction | انقراض |
| Appear | يظهر |
| Algae | طحالب |
| Mosses | حزازيات |
| Gymnosperms | عاريات البذور |
| Angiosperms | كاسيات البذور |
| Invertebrates | اللافقاريات |
| Mullusks with shells | رخويات ذات أصداف |
| Vertebrates | فقاريات |
| Amphibians | برمائيات |
| Reptiles | زواحف |
| Birds | طيور |
| Mammals | ثدييات |
| Exploratory wells | آبار استكشافية |
| Microfossils | حفريات دقيقة |

## Lesson 2

| | |
|---|---|
| Extinction | انقراض |
| Continuous decrease | تناقص مستمر |
| Dying out | فناء |
| Compensation | تعويض |
| Species | أنواع |
| Macro extinctions | انقراضات كبرى |
| Recent extinction | انقراض حديث |
| Meteorites | النيازك |
| Long glacial ages | عصور جليدية طويلة |
| Poisonous gases | غازات سامة |
| Volcanoes | براكين |

| | |
|---|---|
| Interference of man | تدخل الإنسان |
| Destroying natural habitat | تدمير الموطن |
| Overhunting | الصيد الجائر |
| Environmental pollution | تلوث بيئى |
| Climatic changes | تغيرات مناخية |
| Natural disasters | كوارث طبيعية |
| Ecosystem | النظام البيئى |
| Extinct species | أنواع منقرضة |
| Endangered species | أنواع مهددة بالانقراض |
| Protect | يحمى |
| Panda bear | دب الباندا |
| Rhinoceros | الخرتيت |
| Bald eagle | النسر الأصلع |
| Ibis bird | طائر أبو منجل |
| Papyrus plant | نبات البردى |
| Barbary sheep | كبش أروى |
| Ecological equilibrium | توازن بيئى |
| Food chain | سلسلة غذائية |
| Food web | شبكة غذائية |
| Simple ecosystem | نظام بيئى بسيط |
| Complicated ecosystem | نظام بيئى مركب |
| Desert ecosystem | نظام صحراوى |
| Tropical forest ecosystem | نظام غابة استوائية |
| Members | أنواع |
| Barbary sheep | وعى |
| Natural protectorates | محميات طبيعية |
| Safe areas | أماكن آمنة |
| Bluestone protectorate | محمية بلوستون |
| Ras Mohamed protectorate | محمية رأس محمد |
| Coral reefs | شعاب مرجانية |
| Whales' skeletons | هياكل عظمية للحيتان |



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PART 1

# Worksheets



## Worksheets on :

**Unit One :** Periodicity of elements and their properties.

**Unit Two :** The Atmosphere and protecting plant Earth.

**Unit Three :** Fossils and protecting Species from Extinction.

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# UNIT ONE

## Lesson 1 Attempts of Elements Classification

### Worksheet 1

### Question 1

**A Choose the correct answer :**

1. Mendeleev arranged the elements of similar properties in .....
   a. vertical periods. b. horizontal groups.
   c. vertical groups. d. horizontal periods.
2. Moseley classified elements in his table in an ascending order according to their .....
   a. atomic weights. b. atomic numbers.
   c. chemical activity. d. valencies.
3. The number of elements in Mendeleev's periodic table is ..... elements.
   a. 67 b. 76 c. 92 d. 116
4. ..... left gaps in his table to be filled with suitable discovered elements in future.
   a. Moseley b. Rutherford c. Bohr d. Mendeleev
5. The scientist who added zero group is .....
   a. Mendeleev. b. Rutherford. c. Moseley. d. Bohr.
6. The scientist ..... had discovered the main energy levels.
   a. Moseley b. Bohr c. Hofmann d. Mendeleev

**B Write the scientific term :**

1. Arrangement of the elements in an ascending order according to their atomic weights. (.....)
2. Arrangement of the elements in an ascending order according to their atomic numbers. (.....)
3. They are symbolized by K , L , M , N , O , P and Q letters. (.....)

### Question 2

**A Complete the following statements :**

1. Mendeleev discovered that the properties of elements were repeated ..... by the beginning of each new .....



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2. The atomic number of each element in Moseley's periodic table increases by ..... from the preceding element in the same .....
3. ..... and ..... scientists modified the Mendeleev's table.
4. In Mendeleev's table, the elements are arranged in ..... according to their atomic weights.
5. Mendeleev arranged the elements ascendingly according to ..... , while Moseley arranged them ascendingly according to .....
6. Mendeleev explained his periodic table in his book .....

**B What are the disadvantages of Mendeleev's table ? (Mention two only).**

.....

.....

## Question 3

**A To who are these achievements attributed :**

1. Corrected the atomic weights of some elements which were estimated wrongly. (.....)
2. Added zero group to the periodic table. (.....)
3. Discovered that the nucleus of the atom contains positively charged protons. (.....)

**B Put (✓) or (✗), then correct what is wrong :**

1. The elements which have similar chemical and physical properties are put in horizontal periods.
( ) .....
2. Scientists classified the elements in order to facilitate their study.
( ) .....
3. Mendeleev had to put more than one element in one place.
( ) .....
4. Rutherford had discovered the main energy levels of the atom.
( ) .....

## Question 4

**A Give a reason for :**

Scientists thought to classify elements according to their properties.

.....

.....



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PART 1

**B Correct the underlined words :**

1. The elements are arranged in **Mendeleev's table** in an ascending order according to the increase in the atomic number. (.....)
2. Moseley put lanthanides and actinides **on the left side** of the periodic table. (.....)

## Worksheet 2

### Question 1

**A Complete the following statements :**

1. The number of elements which exist in nature is .....
2. Elements of "s" block are located on the ..... of the periodic table and they arranged in ..... groups.
3. The period number of the element equals the number of ..... occupied by electrons in its atom.
4. The transition elements start from period ..... in the modern periodic table.
5. The modern periodic table consists of ..... horizontal periods and ..... vertical groups.

**B What is the scientific principle upon which the elements are arranged in the modern periodic table ?**

.....

.....

### Question 2

**A Write the scientific term :**

1. • A block of elements which is located on the right side of the periodic table.
   • The block which contains the groups from (3A) to (7A). (.....)
2. A kind of elements is symbolized by letter (B). (.....)
3. They are symbolized by s , p , d and f. (.....)
4. The block which contains the lanthanides and actinides. (.....)
5. The elements which occupy the middle block (d) in the periodic table. (.....)



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PART 1

**B** Locate the position of the following elements in the mo

$_{11}Na - _{18}Ar - _{20}Ca - _{9}F$

.....

.....

**B** Mention

**C** Correct the underlined words :

1. The elements in **Moseley's periodic table** are arranged according to the way of filling the energy sublevels with electrons. (.....)
2. The scientist **Rutherford** discovered the main energy levels. (.....)

## Question 3

**A** Choose the correct answer :

1. Elements of "p" block are arranged in ..... groups.

a. two b. five c. six d. eight

2. Which of the following elements locates in the third period ? .....

a. $_{19}K$ b. $_{15}P$ c. $_{6}C$ d. $_{3}Li$

3. All of the following elements are located in group (2A) except .....

a. $_{4}Be$ b. $_{20}Ca$ c. $_{11}Na$ d. $_{12}Mg$

4. The element that its atomic number equals 17 is similar in its chemical properties to the element that its atomic number equals .....

a. 2 b. 7 c. 9 d. 19

5. The elements which have the same properties locate in the same ..... in the periodic table.

a. period b. group c. nucleus d. energy level

6. The block that contains groups (1A) and (2A) in the periodic table is ..... block.

a. s b. p c. d d. f

7. Which of the following elements locates in the same group in the periodic table ? .....

a. $_{11}Na,_{6}C$ b. $_{11}Na,_{3}Li$ c. $_{11}Na,_{29}Cu$ d. $_{11}Na,_{10}Ne$

8. An element, its atomic number is (18) , so it is considered as .....

a. a transition element. b. an inert gas.

c. a metallic element. d. a halogen.



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one difference between : Fluorine molecule and helium molecule :

| Fluorine molecule | Helium molecule |
|---|---|
| ..... | ..... |
| ..... | ..... |

## Question 4

**A** Find the atomic number of each of the following :

1. An element exists in period 2 and group (6A).

.....

2. An element exists in period 3 and group (1A).

.....

3. An element exists in period 2 and zero group.

.....

**B** Put (✓) or (✗), then correct what is wrong :

1. The modern periodic table consists of three blocks of elements.

( ) .....

2. The period number of the element equals the number of electrons in the outermost energy level in its atom.

( ) .....

3. The atomic number of an element increases from an element to the next element in the period by one.

( ) .....

**C** Give a reason for :

Elements of the same group have similar properties.

.....



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# UNIT ONE

## Lesson 2 Graduation of Properties of Elements in the Modern Periodic Table

### Worksheet 3

### Question 1

**Complete the following statements :**

1. ..... is the ability of the atom in covalent molecule to attract the electrons of the chemical bond towards itself.
2. ..... is a polar compound because the difference in ..... between its elements is relatively .....
3. In ammonia molecule, ..... atom attracts the electrons of the bond more than ..... atom as it has higher .....
4. From examples of polar compounds are ..... and .....

### Question 2

**A Give reasons for :**

1. The atomic size of sodium ($_{11}Na$) is greater than that of magnesium ($_{12}Mg$).

.....

.....

2. In groups, by increasing the atomic number, the atomic size increases.

.....

.....

3. Ammonia ($NH_3$) is considered as a polar covalent compound.

.....

4. Water is more polar than ammonia.

.....

**B What happens if ... ?**

There is no difference in electronegativity between hydrogen atom and oxygen atom in water molecule.

.....



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PART 1

## Question 3

**Compare between :**

**1. The atomic size and the electronegativity (concerning the definition) :**

| The atomic size | The electronegativity |
|---|---|
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |

**2. The group and the period. (concerning the graduation of atomic size property) :**

| The group | The period |
|---|---|
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |

## Question 4

**A Write the scientific term :**

1. The measuring unit of atomic radius. (.....)
2. They are covalent compounds in which the difference in electronegativity between elements forming their molecules is relatively high. (.....)

**B Put (✓) or (✗), then correct what is wrong :**

1. In periods, by increasing the atomic number, the atomic size decreases.

( ) .....

2. Ammonia is more polar than water.

( ) .....

# Worksheet 4

## Question 1

**A Write the scientific term :**

1. Elements which have less than 4 electrons in their outermost energy level. (.....)



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2. An atom of nonmetallic element that gains one electron or more during the chemical reactions. (.....)
3. The strongest nonmetal in group (7A). (.....)

**B Correct the underlined words :**

1. The number of electrons in positive ion is **greater** than that of its atom. (.....)
2. Each period ends by **a nonmetal element**. (.....)
3. The metallic property **decreases** in group (1A) as we go from the top to the bottom. (.....)
4. The strongest nonmetal element locates in the **first group**. (.....)

## Question 2

**Complete the following statements :**

1. During chemical reactions, atoms of metals tend to ..... electron(s) and change into ..... which carry a number of positive charges equal to the number of lost .....
2. Silicon ($_{14}Si$) is a ..... element which has the properties of ..... and .....
3. By increasing the atomic number within a period, the metallic property ..... , while the nonmetallic property .....
4. The most metallic element in group (1A) locates at the ..... , while the least metallic element lies at the ..... of the group.
5. Each period in the modern periodic table starts with ..... elements.

## Question 3

**A Choose the correct answer :**

1. All of the following ions have the same electronic configuration of neon ($_{10}Ne$) except .....
   a. $Al^{+3}$ b. $Na^{+}$ c. $Li^{+}$ d. $Mg^{+2}$
2. An element ($X$), its atomic number is 15 so, the number of electrons in its ion equals .....
   a. 10 b. 15 c. 17 d. 18
3. By increasing the atomic number within a period, the .....
   a. metallic property increases. b. metallic property decreases.
   c. nonmetallic property decreases. d. atomic size increases.



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PART 1

4. An element (Y), its atomic number is 13 so, the electronic configuration of its ion is .....

a. 2 , 8 b. 2 , 8 , 3 c. 2 , 8 , 8 d. 2 , 8 , 8 , 3

5. All of the following elements are from semi-metals except .....

a. tellurium. b. silicon. c. boron. d. bromine.

**B Give reasons for :**

• Cesium is considered one of the strongest metallic elements.

.....

## Question 4

**A What is meant by ... ?**

1. Nonmetals : .....

.....

2. Positive ion : .....

.....

3. Metalloids : .....

.....

**B Look at the following figures, then answer the following questions :**

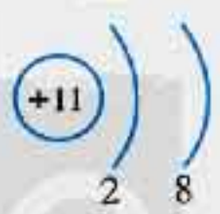


Fig. (A)



Fig. (B)

1. Which of the previous figures represents.

a. A positive ion : .....

b. A neutral atom : .....

2. Determine the position of the atom in the periodic table (period - group) :

.....

## Worksheet 5

## Question 1

**A Show by a symbolic balanced equations each of the following :**

1. Adding dilute HCl to pieces of magnesium.

.....



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2. Burning a magnesium strip in air, then adding some water.

.....

.....

3. Burning a piece of coal in air.

.....

**B Correct the underlined words :**

• Nonmetal oxides are considered as **basic oxides**. (.....)

## Question 2

**A What is meant by ...?**

1. Chemical activity series :

.....

2. Acidic oxides :

.....

**B Choose the correct answer :**

1. All of the following elements don't react with dilute HCl except .....

a. Cu b. Zn c. S d. C

2. All of the following are related to $CO_2$ except .....

a. it is acidic oxide. b. it is nonmetal oxide.

c. its solution turns litmus to red. d. its solution turns litmus to blue.

3. Metal oxides are ..... oxides.

a. acidic b. basic c. neutral d. amphoteric

4. Sodium oxide is from ..... oxides.

a. amphoteric b. acidic c. nonmetallic d. basic

## Question 3

**A Complete the following statements :**

1. Some metal oxides dissolve in water giving ..... which turns litmus solution into .....

2. Sodium reacts with water and ..... gas evolves which ..... with a ..... sound.

3. ..... and ..... are metals which don't react with water.



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PART 1

4. When magnesium oxide dissolves in water, it gives ..... , while carbon dioxide dissolves in water giving .....

5. Basic oxides are formed by the reaction of ..... with oxygen, while acidic oxides are formed by the reaction of ..... with oxygen.

6. $CO_2 + H_2O \longrightarrow$ .....

7. $Mg + 2HCl \xrightarrow{dil.}$ ..... + .....

**B Compare between basic oxides and acidic oxides (two points only) :**

| Basic oxides | Acidic oxides |
|---|---|
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |

## Question 4

**A** $C + O_2 \xrightarrow{\Delta}$ (a)

(a) $+ H_2O \longrightarrow$ (b)

1. Write the name and the chemical formula of each (a) and (b).

.....

2. What is the effect of (b) on litmus solution ?

.....

**B What happens when ... ?**

1. Putting a magnesium strip inside a jar filled with oxygen gas.

.....

2. Adding drops of violet litmus solution to a cylinder containing a piece of burning coal.

.....

3. Dissolving magnesium oxide in water.

.....



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# Worksheet 6 on Lessons 1 & 2 Unit ONE

## Question 1

### A Choose the correct answer :

1. Mendeleev arranged elements of similar properties in vertical columns called later as .....

a. groups. b. periods. c. rows. d. no correct answer.

2. ..... explained his periodic table in his book "principles of chemistry".

a. Moseley b. Rutherford c. Bohr d. Mendeleev

3. Helium locates in ..... group.

a. 2A b. 3A c. 4A d. zero

4. Nucleus is positively charged because it contains .....

a. electrons. b. protons. c. neutrons. d. (a) and (b).

5. ..... react very slowly with cold water.

a. Ca & Mg b. K & Na c. Zn & Fe d. Cu & Ag

### B Give reasons for :

1. Mendeleev left gaps in his periodic table.

.....

.....

2. Sulphur dioxide is considered an acidic oxide.

.....

## Question 2

### A Complete the following :

1. ..... discovered that the nucleus contains positively charged protons.
2. The largest atom of elements in size is ..... atom and the smallest one is ..... atom.
3. ..... and ..... don't react with water.



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PART 1

**B Locate the position of the following elements in the modern periodic table :**

$_{10}Ne - _{5}B - _{14}Si - _{6}C$

.....

.....

.....

.....

## Question 3

**A Put (✓) or (✗), then correct what is wrong :**

1. The p-block elements are located in the left side of the periodic table.

( ) .....

2. The f-block contains lanthanides and actinides.

( ) .....

3. $Na_2O$ is an acidic oxide.

( ) .....

**B What happens when ... ?**

1. Carbon reacts with oxygen.

.....

2. Sodium loses one electron during the chemical reaction.

.....

## Question 4

**A Find the atomic number of each of the following :**

1. An element exists in period 4 and group (1A).

.....

2. An element exists in period 2 and group (7A).

.....

3. An element exists in period 3 and group (5A).

.....

**B What is meant by amphoteric oxides ?**

.....



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# UNIT ONE

## Lesson 3 Main Groups in the Modern Periodic Table

### Worksheet 7

### Question 1

**A Write the scientific term :**

1. Elements which are located at the left side of the periodic table in group (1A). (.....)
2. The most active metal. (.....)

**B Choose the correct answer :**

1. Elements which have atomic numbers ..... are called alkali metals.
   a. 2 , 8 , 16 b. 2 , 10 , 18 c. 3 , 11 , 19 d. 4 , 12 , 20
2. Alkali metals have the following properties except .....
   a. they have low density. b. they conduct electricity.
   c. they conduct heat. d. they don't react with water.
3. When sodium reacts with water, ..... gas evolves.
   a. $O_2$ b. $CO_2$ c. $H_2$ d. $NO_2$
4. ..... are kept under the surface of kerosene in the lab.
   a. Alkali metals b. Halogens c. Inert gases d. Alkaline earth metals
5. The most active element in group (1A) is .....
   a. Na b. Cs c. K d. Li

### Question 2

**Give reasons for :**

1. Elements of group (1A) are known as alkali metals.

.....

2. Sodium is kept under the surface of kerosene.

.....

.....



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PART 1

3. Rubidium and cesium elements sink in water.

.....

4. The reaction of potassium with water is stronger than that of sodium.

.....

.....

.....

## Question 3

**Complete the following statements :**

1. Lithium element ..... water surface as its density is ..... than that of water.
2. During the chemical reactions , sodium tends to ..... an electron and changes into ..... ion which carries ..... positive charge.
3. Potassium reacts with water giving ..... and ..... gas evolves.
4. The chemical activity of alkali metals ..... as the ..... increases.
5. When sodium reacts with water, ..... gas evolves.

## Question 4

**The opposite figure represents group (1A) of the periodic table.**

**Answer the following questions :**

1. The element which has the electronic configuration (2, 8, 8, 1) is .....
2. The most metallic element is .....
3. Elements which float on the water surface are .....
4. The least metallic element is .....

| |
|---|
| A |
| B |
| C |
| D |
| E |
| |

# Worksheet 8

## Question 1

**A Complete the following :**

1. Halogens locate in group .....
2. ..... and ..... are halogens which exist in gaseous state.
3. ..... is used in food preservation.
4. Silicon is used in manufacture of ....., while liquefied nitrogen is used in .....

**B Write the scientific term :**

1. The halogen which exists in a liquid state. (.....)
2. Rays which are emitted from cobalt (60). (.....)



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## Question 2

**A Which of the following elements $_{11}X$ , $_{17}Y$ , $_{14}Z$ :**

1. Can replace iodine in potassium iodide solution : .....
2. Used in the manufacture of electronic slides : .....
3. Can react together and form salt : .....

**B Mention one use for each of the following :**

1. Silicon slides : .....
2. Liquid sodium : .....
3. Cobalt 60 : .....

## Question 3

**A Put (✓) or (✗), then correct what is wrong :**

1. Halogens are monovalent elements.
( ) .....
2. Boiling point of liquefied nitrogen is (–196°C).
( ) .....
3. Bromine is a halogen which exists in a solid state.
( ) .....

**B Give reasons for :**

1. Halogens are not exist in nature in elementary state.
.....
2. Halogens are called by this name.
.....
3. Liquefied nitrogen is used in cornea preservation.
.....

## Question 4

**A Complete the following equations :**

1. $Br_2 + NaCl \longrightarrow$ .....
2. $Cl_2 + 2KI \longrightarrow$ ..... + .....
3. $2K + Br_2 \longrightarrow$ .....

**B Choose the odd word out, then mention the scientific term for the rest :**

1. Potassium / Iodine / Fluorine / Astatine / Bromine.
2. Fluorine / Chlorine / Oxygen / Hydrogen / Sodium.

.....

.....



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PART 1

## Worksheet 9 on Lessons 1, 2 and 3 Unit ONE

### Question 1

**A Complete the following statements :**

1. ..... is a radioactive element.
2. Halogens mean .....
3. ..... and ..... are examples of acidic oxides.
4. Elements of the same ..... are similar in the number of electrons in the outermost energy level.

**B Write the scientific term of each of the following :**

1. The metalliod which is used in the manufacture of electronic devices. (.....)
2. The halogen which exists in a solid state. (.....)

### Question 2

**A Correct the underlined words :**

1. Liquefied nitrogen is used in **food preservation**. (.....)
2. Halogens exist in the form of **monoatomic** molecules . (.....)
3. Transition elements lie in **s-block**. (.....)

**B Give reasons for :**

1. Elements of group (1A) are known as alkali metals.

.....

.....

2. Iodine can't replace bromine in its salt solution.

.....

.....



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## Question 3

**A Choose the odd word out :**

1. $SO_2$ / MgO / $Na_2O$ / CaO

.....

2. Fluorine / Chlorine / Iodine.

.....

3. Sodium / Magnesium / Aluminium / Sulphur.

.....

**B What happens when ... ?**

1. Increasing the atomic number in period 1 (Concerning the atomic size).

.....

.....

2. We go from down to up inside group 7A (Concerning chemical activity).

.....

.....

## Question 4

**A Choose the correct answer :**

1. ..... is used in food preservation.

a. Sodium b. Cobalt 60 c. Silicon d. Liquefied nitrogen

2. Carbon dioxide reacts with water forming .....

a. $H_2CO_3$ b. HCl c. $HNO_3$ d. $H_2SO_4$

3. $Al_2O_3$ is known as .....

a. acidic oxide. b. basic oxide.

c. amphoteric oxide. d. (a) and (b) are correct.

**B Silicon is a semi-conductor of electricity. Explain.**

.....

.....



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# UNIT ONE

## Lesson 4 Water

### Worksheet 10

### Question 1

**A Choose the correct answer :**

1. All of the following are from water properties except .....
   a. it exists in three states.
   b. it has high boiling point.
   c. it is used in generating electricity.
   d. it is a non-polar compound.
2. Water molecule consists of .....
   a. two atoms of three different elements.
   b. three atoms of two different elements.
   c. three atoms of three different elements.
   d. four atoms of two different elements.

**B What is the importance of Hofmann's voltameter :**

.....

### Question 2

**A Complete the following statements :**

1. Water is considered as a good ..... solvent , as it dissolves most .....compounds.
2. The density of water in ..... state is lower than its density in ..... state.
3. Water molecule consists of ..... atoms and ..... atom.
4. The bond between water molecules is called ..... bond.
5. Increasing the boiling point of water is due to .....

**B What is meant by hydrogen bond ?**

.....

.....

### Question 3

**A Mention what happens when ... ?**

- The temperature of water decreases than 4°C.

.....

.....

**B Put (✓) or (✗), then correct what is wrong :**

1. Table salt and sugar are from covalent compounds.

( ) .....



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2. The angle between the two covalent bonds in water molecule is 104.5°.
( ) .....

3. Hydrogen bond is weaker than covalent bond.
( ) .....

## Question 4

### A Write the scientific term :

1. The bond between hydrogen atom and oxygen atom in water molecule. (.....)
2. The bond which links the molecules of water. (.....)
3. The positive pole of Hofmann's voltameter. (.....)
4. Ions responsible for the basic property in water molecule. (.....)

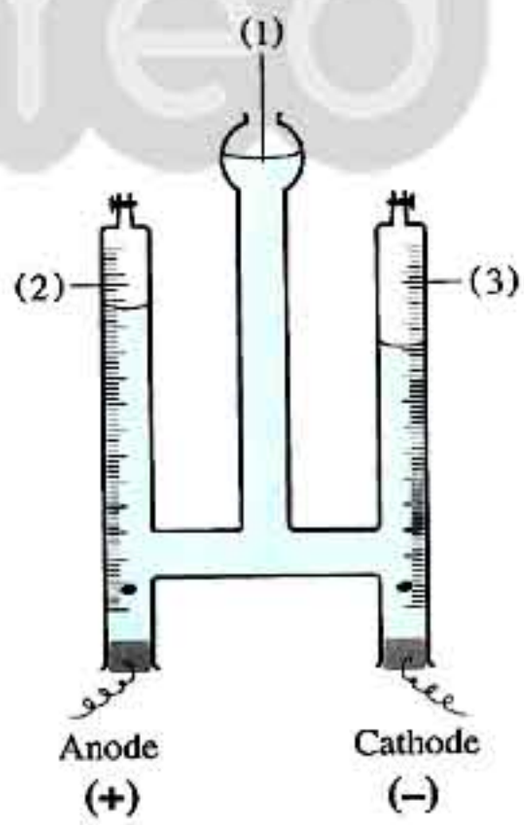
### B Give reasons for :

1. Ice floats on water surface.
.....
2. Adding drops of dilute acid to water during its electrolysis.
.....
3. The closed glass bottle filled with water is broken when it is put in freezer.
.....
4. Sugar dissolves in water although it is a non-polar compound.
.....
5. Water has neutral effect on both litmus papers.
.....

## Question 5

### A From the opposite figure , answer the following questions :

1. What is the name of this apparatus?
.....
2. Label the numbers (1) , (2) and (3).
(1) ..... (2) ..... (3) .....
3. What happens if a glowing splint is put above the anode and the cathode?
* Above the anode, .....
* Above the cathode, .....
4. Write the balanced equation of this reaction.
.....
5. Calculate the volume of the gas that evolves at the anode if the volume of the gas that evolves at the cathode is 20 $cm^3$.
.....






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PART 1

B 1. Calculate the colume of the gas which evolves above the negative pole in Hofmann's voltameter if the volume of the gas which evolves above the positive pole is 30 $cm^3$.

.....

2. On the electrolysis of a certain volume of acidified water by dilute sulphuric acid, the colume of the gas that evolves above the cathode is 10 $cm^3$. What is the volume of the gas that evolves at the anode ?

.....

## Worksheet 11

### Question 1

**Explain what happens when :**

1. Storing the tap water in empty plastic bottles.

.....

.....

2. Water is polluted by the wastes of man and animal.

.....

.....

### Question 2

**Complete the following :**

1. Mixing of animals and human wastes with water leading to the infection by many diseases such as ..... , ..... and .....
2. Increasing the mercury concentration in drinking water causes ..... , while arsenic increases the infection rate by .....
3. We must ..... the drinking water tanks and don't store the tap water in ..... bottles.
4. Eating fishes contain high concentration of lead cause the ..... of brain cells.
5. The nuclear reactors cause both ..... and ..... pollution for water.

### Question 3

A 1. Nuclear reactors cause thermal pollution and radiant pollution. Explain.

.....

.....

.....

.....



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2. How to protect water from pollution ? (Two points only)

.....

.....

**B Write the scientific term :**

1. A kind of water pollution which results from mixing of humans and animals wastes with water. (.....)
2. A kind of water pollution which results from discharging of factories residues and sewage in rivers and seas. (.....)
3. A water pollutant which causes the death of brain cells. (.....)

## Question 4

**A What is meant by water pollution ?**

.....

.....

.....

**B Put (✓) or (✗), then correct what is wrong :**

1. Eating food containing high percentage of lead causes hepatitis.

( ) .....

2. Adding of agricultural fertilizers to water causes water pollution.

( ) .....

3. Storing the tap water in plastic bottles causes the increase of infection with hepatitis.

( ) .....



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# General Exercise of the School Book on Unit ONE

## 1 Choose :

1. Scientist ..... discovered the main energy levels in the atom.

a. Bohr b. Mendeleev c. Moseley d. Hofmann

2. Sodium oxide is from ..... oxides.

a. amphoteric b. acidic c. nonmetallic d. basic

3. All of the following elements are from semi-metals except .....

a. tellurium. b. silicon. c. boron. d. bromine.

4. The strongest metal locates in the ..... group.

a. 2A b. 1A c. 1B d. 7A

## 2 What is meant by ...?

1. Chemical activity series :

.....

2. Water pollution :

.....

3. Semi-metals :

.....

## 3 How can you differentiate between magnesium oxide and sulphur oxide ?

.....

.....

## 4 What is the importance of ?

1. Liquefied nitrogen : .....
2. Sodium : .....
3. Water : .....

## 5 Give reasons for :

1. The use of radioactive cobalt 60 in food preservation.

.....

.....



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2. Elements of the same group have similar properties.

.....

.....

3. The boiling point of water is high.

.....

.....

4. Alkali metals are kept under kerosene in the lab.

.....

.....

**6 What is the effect of the following on the water environment ?**

1. Drainage of factories wastes in rivers and seas :

.....

.....

2. Using of rivers and seas water as a renewable source for cooling the nuclear reactor :

.....

.....

3. Mixing of animal and man wastes with water :

.....

.....

Rania Sayed



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# Model Exams on Unit ONE

## Model Exam 1

20

**Answer the following questions :**

### Question 1 5 marks

**Choose the correct answer :**

1. Pure water in the normal atmospheric pressure boils at ..... °C

a. 50 b. 90 c. 100 d. 10

2. Polar water molecules are linked together by ..... bonds.

a. hydrogen b. covalent c. ionic d. no correct answer

3. ..... has the properties of both metals and nonmetals.

a. Na b. Cl c. B d. Ne

4. The number of elements in Mendeleev's periodic table is ..... elements.

a. 92 b. 118 c. 76 d. 67

5. metal oxides are ..... oxides.

a. acidic b. basic c. amphoteric d. no correct answer

### Question 2 5 marks

**A Correct the underlined words :**

1. Pure water is a **good** conductor of electricity. (.....)
2. The **cathode** is the positive pole in Hofmann's voltameter. (.....)
3. **Moseley** discovered that the nucleus of the atom contains positively charged protons. (.....)

**B Give reasons for :**

1. Occurrence of radiant pollution.

.....

2. Thermal pollution leads to death of marine cultures.

.....

.....



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**Question 3** *5 marks*

**A Complete the following sentences :**

1. ..... is used in the transferring heat from inside the nuclear reactor to outside.
2. Acidic oxides dissolve in water giving .....
3. Nuclear reactors cause both of ..... pollution and ..... pollution.
4. ..... and ..... are examples of nonmetals.
5. ..... + ..... $\longrightarrow H_2CO_3$

**B Mention an example of a metalloid used in the manufacture of electronic devices.**

.....

**Question 4** *5 marks*

**A What happens when ... ?**

1. Dumping the atomic wastes in oceans and seas.

.....

2. Adding dil. HCl to a piece of copper.

.....

**B Explain how we can dissolve the ice of the freezer quickly.**

.....

.....

## Model Exam 2

20

**Answer the following questions :**

**Question 1** *5 marks*

**Complete the following sentences :**

1. ..... is responsible for the abnormal properties of water.
2. Water has ..... effect on litmus paper.
3. ..... , ..... and ..... are examples of halogens.



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PART 1

4. ..... is the measuring unit of atomic radius.

5. $Mg + 2HCl \xrightarrow{Dil.}$ ..... + .....

6. ..... is the positive pole in Hofmann's voltameter, while ..... is the negative pole.

## Question 2 5 marks

**A Put (✓) or (✗) :**

1. The angle between two single covalent bonds of water is 104.5° ( )
2. Eating food containing high concentration of arsenic causes blindness. ( )
3. The boiling point of liquefied nitrogen is (–196°C). ( )

**B Give reasons for :**

1. It is dangerous to eat food containing high concentration of mercury.

.....

.....

2. Both nitrogen and lithium are located in the same period.

.....

.....

.....

## Question 3 5 marks

**A Choose the correct answer :**

1. The elements of modern periodic table are classified into .....

a. one block. b. two blocks. c. three blocks. d. four blocks.

2. ..... is an atom of nonmetallic element which gains an electron or more during chemical reactions.

a. Positive ion b. Negative ion c. Excited atom d. No correct answer

3. ..... is used in nuclear reactors.

a. Silicon b. Cobalt 60 c. Liquefied nitrogen d. Liquid sodium

**B What happens when ... ?**

1. Adding few drops of dilute sulphuric acid to water (during its electrolysis).

.....

.....

2. We approach a glowing splint to oxygen gas.

.....

.....



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## Question 4 — 5 marks

**A** Compare between elements of group (1A) and group (7A) concerning (Name - Valency - Kind of formed ions - block)

| Points of comparison | Elements of group (1A) | Elements of group (7A) |
|---|---|---|
| Name : | ..... | ..... |
| Valency : | ..... | ..... |
| Kinds of formed ions : | ..... | ..... |
| Block : | ..... | ..... |

**B** Mention the types of water pollution.

.....

.....

RaNia SaYed



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# UNIT TWO

## Lesson 1 The Atmospheric Layers

### Worksheet 12

### Question 1

**A Choose the correct answer :**

1. The air in the troposphere layer moves .....
   a. horizontally. b. vertically. c. inclined. d. no right answer.
2. The device which is used in measuring the altitude above sea level is the .....
   a. altimeter. b. aneroid. c. ammeter. d. (a) and (b).
3. The density of air ..... by increasing the elevation above the sea level.
   a. increases b. decreases c. doesn't change d. no correct answer
4. ..... layer extends from the sea level to the tropopause.
   a. Troposphere b. Stratosphere c. Mesosphere d. Thermosphere
5. ..... layer extends from stratopause to mesopause.
   a. Troposphere b. Stratosphere c. Mesosphere d. Thermosphere
6. The atmospheric pressure on the top of a mountain is ..... the atmospheric pressure at the sea level.
   a. more than b. less than c. equal to d. half
7. ..... is located between stratosphere and mesosphere.
   a. Tropopause b. Stratopause c. Mesopause d. Stratosphere

**B Problem :**

If the temp. at the foot of Everest mountain is 20.6°C. Find the temp. at its top of height 8862 m. above Earth's surface.

.....

.....

### Question 2

**Give reasons for :**

1. Most of weather conditions take place in troposphere layer.

   .....

2. The troposphere layer regulates the Earth's temperature.

   .....



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3. The atmospheric pressure in troposphere layer decreases by increasing the height above sea level.

.....

4. The air motion is vertical in the troposphere layer.

.....

.....

## Question 3

**Complete the following statements :**

1. The thickness of troposphere layer is about .....
2. As we go up 1 km above the sea level, the temperature ..... with .....
3. Most weather features occur in .....
4. Troposphere layer contains about ..... of the mass of the atmospheric air and about ..... of atmospheric water vapour.
5. The aneroid is used to .....
6. The ..... is a device used to measure the height of aeroplanes.

## Question 4

**A** 1. **Compare between :**

**The atmospheric pressure and the atmospheric envelope [in the view of definition].**

| The atmospheric pressure | The atmospheric envelope |
|---|---|
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |

2. Calculate the height of a mountain if temperature at its foot is 19°C and at its top is 6°C.

.....

**B** **Arrange :**

1. The layers of atmospheric envelope [according to the change in atmospheric pressure].

.....

2. The atmospheric layers [starting from the farthest to the Earth's surface].

.....



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PART 1

**C Put (✓) or (✗), then correct what is wrong :**

1. There is about 50% of the mass of atmospheric air in the area between sea level and 3 km. height.

( ) .....

2. The standard atmospheric pressure at sea level equals 76 mb.

( ) .....

3. Troposphere layer contains most of atmospheric turbulences.

( ) .....

## Worksheet 13

### Question 1

**A Complete the following statements :**

1. The thickness of stratosphere is ..... , while that of mesosphere is .....
2. Luminous ..... are formed in mesosphere layer due to its friction with .....
3. The highest temperature layer in the atmosphere is ..... and the lowest temperature one is .....
4. The coldest layer in the atmospheric envelope is .....
5. Van-Allen belts surround .....

**B What is meant by ... ?**

1. Aurora phenomenon : .....
.....
2. Van-Allen belts : .....
.....
3. Exosphere region : .....
.....
4. Ionosphere : .....
.....

**C What happens when there is no ionosphere layer at the end of thermosphere layer?**

.....



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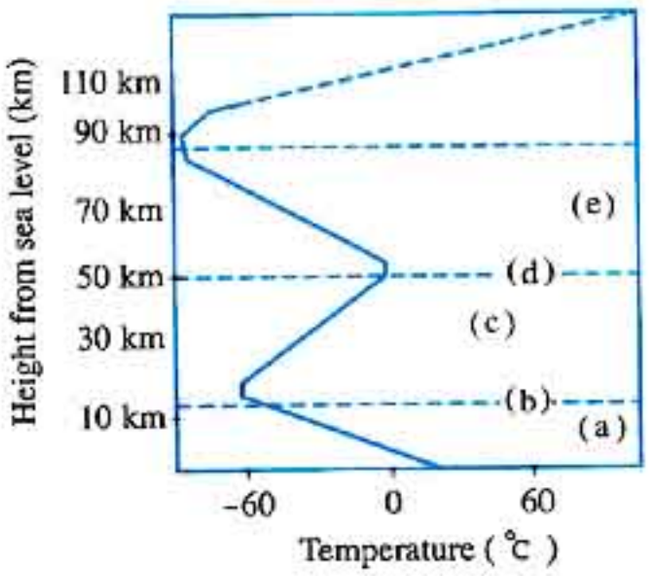
## Question 2

**A The opposite figure exhibits the temp. changes in the layers of atmospheric envelope :**

1. Replace the letters on the drawing with suitable labels.

.....

.....




2. Which layer is :

(1) The highest in temp. ? .....

(2) The lowest in temp. ? .....

**B Put (✓) or (✗), then correct what is wrong :**

1. Satellites orbit around the Earth in exosphere region.

( ) .....

2. The air moves horizontally in the bottom part of stratosphere.

( ) .....

3. Troposphere is important for wireless communication.

( ) .....

4. Ozone layer is found in thermosphere layer.

( ) .....

**C 1. Compare between :**

**The troposphere layer and the ionosphere layer [in the view of : pressure and temperature]**

| P.O.C. | The troposphere layer | The ionosphere layer |
|---|---|---|
| - Pressure : | ..... | ..... |
| - Temperature : | ..... | ..... |

**2. What is the importance of Van-Allen belts ?**

.....

## Question 3

**A Give reasons for :**

1. • The lower part of stratosphere is suitable for flying aeroplanes.

• Pilots prefer to fly their planes in the lower part of stratosphere.

.....



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PART 1

2. Ionosphere plays an important role in communication.

.....

3. The temperature increases as we go higher in stratosphere layer.

.....

4. The stratosphere layer is called by ozonic atmospheric envelope.

.....

5. The upper part of thermosphere is called ionosphere.

.....

**B** **Compare between : Troposphere and stratosphere layers. (concerning : temperature and atmospheric pressure)**

| P.O.C. | Troposphere layer | Stratosphere layer |
|---|---|---|
| - Temperature : | ..... | ..... |
| - Atmospheric pressure : | ..... | ..... |

## Question 4

**A** **What is the importance of :**

1. Ozone layer : .....
2. Satellites : .....
3. Thermosphere : .....

**B** **Choose the correct answer :**

1. The planes fly in ..... layer.
   a. troposphere b. stratosphere c. mesosphere d. thermosphere
2. ..... layer extends from tropopause to stratopause.
   a. Troposphere b. Stratosphere c. Mesosphere d. Thermosphere
3. Charged cosmic radiations reflect in ..... layer.
   a. troposphere b. stratosphere c. mesosphere d. ionosphere
4. Ionosphere is surrounded by two ..... belts.
   a. magnetic b. ionic c. electric d. heat
5. Meteors are formed in ..... layer.
   a. mesosphere b. ionosphere c. exosphere d. stratosphere



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# UNIT TWO

## Lesson 2 Erosion of Ozone Layer and Global Warming

### Worksheet 14

### Question 1

**Put (✓) or (✗) :**

1. The ozone molecule is formed by bonding free oxygen atom with an oxygen molecule.( )
2. Ozone layer is located at a height 20 - 30 km. above sea level. ( )
3. Far UV penetrate the ozone layer with ratio 100%. ( )
4. Erosion of ozone layer and global warming phenomenon are from the dangerous phenomena that face Earth planet atmosphere. ( )

### Question 2

**Write the scientific term :**

1. A type of ultraviolet radiations that is absorbed completely (100%) by the ozone layer. (.....)
2. Thinning or losing parts of ozone layer. (.....)
3. A kind of gases formed in the stratosphere layer. (.....)
4. A unit measures the degree of ozone. (.....)

### Question 3

**A Explain with equations the role of ultraviolet radiations in the formation of ozone gas.**

.....

.....

**B 1. What is meant by ... ?**

Standard temperature and pressure.

.....

.....

**2. What is the importance of ozone layer ?**

.....

.....



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PART 1

## Question 4

**Complete the following sentences :**

1. The ozone layer disperses the ..... rays away from the Earth's surface.
2. The type of ultraviolet rays that penetrate the ozone layer with a ratio 100% is .....
3. Nanometer = ..... m.
4. In September each year, the quantity of ozone gas ..... because all pollutants regroup and are pushed by wind towards the ..... pole leading to increase the erosion of .....
5. On formation of ozone layer, the oxygen molecule absorbs ..... which breaks the bond between ..... to make each atom binds with ..... forming the ozone molecule.
6. The erosion of ozone layer increases every year in .....

## Question 5

**Give reasons for :**

1. Increasing the size of ozone hole in September every year.

.....

.....

2. Formation of ozone layer in the stratosphere layer.

.....

.....

# Worksheet 15

## Question 1

**Mention :**

1. The most dangerous pollutants of ozone layer.

.....

.....

2. The reasons for increasing $CO_2$ gas ratio in the atmosphere.

.....

.....

3. The use of halons.

.....



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## Question 2

**A What is meant by ... ?**

• IPCC : .....

.....

**B Choose the correct answer :**

1. ..... is/are used as cooling substance in cooling devices.
   a. Methyl bromide gas  b. Halons
   c. Nitrogen oxides  d. Freon
2. ..... result(s) from the burning of fuel of ultrasound aeroplanes (concorde).
   a. Methyl bromide gas  b. Halons
   c. Nitrogen oxides  d. Freon
3. ..... is/are used as an insecticide to preserve stored agricultural crops.
   a. Methyl bromide gas  b. Halons
   c. Nitrogen oxides  d. Freon

## Question 3

**A Explain an activity to show the concept of greenhouse effect :**

.....

.....

.....

.....

.....

.....

**B What happens when overuse of freon ?**

.....

.....

## Question 4

**A Put (✓) or (✗), then correct what is wrong :**

1. Methyl bromide is used in extinguishing fires.
   ( ) .....
2. Methane gas and nitrous oxide are considered from greenhouse gases.
   ( ) .....
3. Halogens are produced from ultrasound aeroplanes.
   ( ) .....



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PART 1

B Mention the pollutants of ozone layer.

.....

.....

.....

## Worksheet 16

### Question 1

**A What would happen if ... ?**

1. Earth's temperature increases [concerning climatic changes].

.....

2. The melting rate of polar ice is increased.

.....

3. The ratio of nitrogen oxides in the atmospheric envelope increases.

.....

4. Infrared radiations don't pass through troposphere layer.

.....

**B What is meant by greenhouse effect ?**

.....

.....

### Question 2

**Complete the following statements :**

1. ..... and ..... are from the examples of the climatic changes produced by global warming.
2. The ultraviolet radiation has a ..... effect, while the infrared radiation has a ..... effect.
3. The glass permits the passage of ..... and ..... rays coming from the Sun to be absorbed by Earth in the greenhouse.
4. Global warming phenomenon means .....



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## Question 3

### A Give reasons for :

1. Melting of ice and snow of both South and North poles.

.....

2. Infrared radiation cannot penetrate the Earth's atmosphere.

.....

3. Burning of fossil fuel should be reduced.

.....

4. Increasing $CO_2$ gas ratio in the atmosphere.

.....

### B Choose the correct answer :

1. Global warming happens because of .....

a. the lack of $CO_2$ in the atmospheric envelope.

b. the increase of the amount of $CO_2$ in the atmospheric envelope.

c. the lack of plants on Earth.

d. (b) & (c) together.

2. The erosion of the ozone layer differs from a year to another because of .....

a. amount of pollutants.

b. the lack of plants on Earth.

c. the lack of $CO_2$ in atmospheric envelope.

d. the lack of ozone gas in atmospheric envelope.

3. The increase of $CO_2$ percentage is caused by .....

a. cutting trees. b. burning forests.

c. burning fossil fuel. d. (a), (b) and (c) are correct.

4. Melting of ice in the North and South poles leads to the extinction of polar animals like .....

a. crocodiles. b. deers. c. monkeys. d. polar bears.

5. Ozone layer doesn't allow the passage of ..... ultraviolet rays.

a. far b. medium c. near d. (a) & (b) together

6. All of the following gases are greenhouse gases except .....

a. $CO_2$ b. $O_2$ c. $N_2O$ d. $CH_4$



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PART 1

# General Exercise of the School Book on Unit 2

**1 Replace each of the following statements by a suitable scientific term :**

1. The boundary separating between stratosphere and mesosphere where temperature is rather constant. (.....)
2. Charged layer reflects radio waves. (.....)
3. One of the atmosphere components that its ratio increased in recent years to reach about 0.038 %. (.....)
4. A type of ultraviolet radiation that is absorbed completely (100%) in the Ozone Layer. (.....)

**2 Complete the following phrases :**

1. The highest temperature layer in the atmosphere is ..... and the least temperature one is .....
2. Most of weather features occur in ..... layer whereas satellites swim through the ..... layer.
3. Ultraviolet radiation has a ..... effect, and the infrared radiation has a ..... effect.
4. Among the pollutants of the ozone layer are ..... compounds that are used in air conditioning sets and ..... compounds that are used in fire extinguishers.

**3 Illustrate with formulas only the role of ultraviolet radiation in the formation of Ozone gas.**

.....

.....

.....

**4 An aeroplane captain announced that the atmospheric pressure outside the aeroplane is 90 millibar. In which layer of the atmosphere was the plane flying ? Why ?**

.....

.....



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Workbook
Unit Two

❺ Compare between mesosphere and thermosphere in terms of temperature, importance, and air pressure.

.....

.....

| P.O.C | Mesosphere | Thermosphere |
|---|---|---|
| • Temperature : | ..... | ..... |
| • Importance : | ..... | ..... |
| • Air pressure : | ..... | ..... |

❻ Calculate the height of a mountain if the temperature at its foot is 30°C and at its top is –6 °C :

.....

❼ What are the similarities between greenhouse effect and global warming ?

.....

.....

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# Model Exams on Unit TWO

## Model Exam 1

20

**Answer the following questions :**

### Question 1 *5 marks*

**Choose the correct answer :**

1. Troposphere contains about ..... % of the mass of atmospheric air.

a. 50 b. 60 c. 75 d. 90

2. The thickness of stratosphere layer is ..... km.

a. 1000 b. 13 c. 50 d. 37

3. ..... layer is surrounded by Van-Allen belts.

a. Troposphere b. Stratosphere c. Ionosphere d. Mesosphere

4. Pilots prefer to fly in the ..... of stratosphere layer.

a. upper part b. lower part c. front d. no correct answer

5. ..... gas is produced from the reaction between sodium bicarbonate and vinegar.

a. $CH_4$ b. $N_2O$ c. $H_2O$ d. $CO_2$

### Question 2 *5 marks*

**A Put (✓) or (×) , then correct what is wrong :**

1. Chlorofluorocarbon compounds are dangerous to the environement.

( ) .....

2. Van-Allen belts are called by this name related to the aurora phenomenon.

( ) .....

3. Mesosphere is called thermal layer.

( ) .....



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**B Give reasons for :**

1. The importance of Van-Allen belts.

.....

2. The upper part of thermosphere layer is called ionosphere.

.....

## Question 3 5 marks

**A Compelete the following sentences :**

1. ..... , ..... and forests fires are the reasons of increasing greenhouse gases ratio in the atmosphere.
2. ..... is used to determine the possible day weather.
3. The air movement in ..... layer is vertical, while in ..... layer is horizontal.
4. ..... is a region in which the atmospheric envelope is inserted in outerspace.

**B What happens when ... ?**

1. We go up above sea level. [concerning the atmospheric pressure]

.....

2. Oxygen atom combines with oxygen molecule.

.....

## Question 4 5 marks

**What is meant by ... ?**

1. Freon :

.....

2. Ozone hole :

.....

3. $CFC_s$ :

.....

4. Stratopause :

.....

5. Normal atmospheric pressure :

.....



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PART 1

# Model Exam 2

20

**Answer the following questions :**

## Question 1 5 marks

**Compelete the following statements :**

1. The statement ..... means that the products don't contain chlorofluorcarbon compounds.
2. ..... don't penetrate ozone layer by a ratio 95 %.
3. Scientist ..... postulated that the thickness of the ozone layer is compressed into 3 mm.
4. Ozone layer is mainly located at a height ..... km above sea level
5. ..... is used by pilots in aeroplanes to measure the elevation above sea level.
6. $O_2 \xrightarrow{uv}$ ..... + .....

   ..... + ..... $\longrightarrow O_3$

## Question 2 5 marks

**A Choose the correct answer :**

1. ..... is the region between mesosphere and thermosphere.

   a. Tropopause b. Stratopause c. Mesopause d. Thermopause

2. 1 bar (b) = ..... millibar (mb).

   a. 100 b. 10 c. 1000 d. 500

3. ..... is/are used as a flating substance in making foam backing.

   a. Chlorofluorocarbon compounds b. Nitrogen oxides

   c. Methyl bromide gas d. Halons

**B Give reasons for :**

1. Van-Allen belts are called by this name.

   .....

2. The stratosphere layer is called by ozonic atmospheric envelope.

   .....



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## Question 3 5 marks

### A Correct the underlined words :

1. Water vapour is from **ozone pollutants**.

.....

2. All pollutatnts of ozone layer assemble as black clouds that are pushed by wind towards the **north pole**.

.....

3. The thickness of mesosphere layer is **50 km**.

.....

### B What happens when .... ?

1. There is no ionosphere layer.

.....

2. Overuse of freon.

.....

## Question 4 5 marks

### A Mention four examples of greenhouse gases :

1. ..... 2. .....

3. ..... 4. .....

### B Compare between : Troposphere and mesosphere layers :

| Troposphere layer | Mesosphere layer |
|---|---|
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |



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# UNIT THREE

## Lesson 1 Fossils

### Worksheet 17

### Question 1

**Choose the correct answer :**

1. Which of the following terms is the most accurate expression for the traces and remains of old living organisms that were preserved in sedimentary rocks ? .....

a. Extinction. b. Red list. c. Fossils. d. Petrification.

2. ..... is/are from the suitable conditions for fossil formation of any organism.

a. A hard skeleton

b. A medium protects it from decomposition

c. Buried immediately after death

d. All the previous answers

3. What is the kind of fossil that is formed when a plant leaf falls on a soft sedimentary rock at the beginning of formation, then hardening ? .....

a. Trace. b. Mold. c. Cast. d. Petrified fossil.

4. Mammoth fossil is an example of ..... fossil.

a. cast b. mold c. complete body d. petrified

### Question 2

**A What is the difference between .... ?**

1. Mammoth fossil and amber fossil :

| Mammoth fossil | Amber fossil |
|---|---|
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |



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2. Cast and mold :

| Cast | Mold |
|---|---|
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |

## B Mention :

1. One example for complete body fossil : .....

2. The suitable conditions for fossils preservation : .....

.....

3. One example for the trace : .....

## Question 3

**Mention the name and the type of each fossil illustrated in the following figures :**



*Fig. (1)*

.....

.....



*Fig. (2)*

.....

.....



*Fig. (3)*

.....

.....

## Question 4

**What is meant by ... ?**

1. Amber : .....

2. Petrification : .....

.....

3. Fossils : .....

.....



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PART 1

## Question 5

### A Give reasons for :

1. The petrified woods are considered from fossils although they look like rocks.

.....

.....

2. Naming the petrified forests with wood mountain.

.....

.....

3. Amber is considered a suitable medium for formation of complete body fossils.

.....

.....

### B Complete the following sentences :

1. The suitable medium for formation the mammoth fossil is .....
2. The first mammoth fossil was discovered in ..... century which keeps the .....
3. When the snail shell of ..... decomposes, it will leave ..... which carries the ..... details for the snail.
4. The resinous matter is secreted from ..... which were common during some ..... geologic ages.
5. Fossils always exist in the ..... rocks.

## Worksheet 18

## Question 1

### A Complete the following statements :

1. The presence of microfossils as radiolaria and foraminifera in the rocks of the exploratory wells point to the ..... of rocks existed in them and the suitable conditions for ..... exploration.
2. Archaeopteryx represents the link between ..... and .....
3. Fossils are used in ..... exploration and determining the age of .....
4. ..... fossil is present in ..... rocks of El-Mokattam's mountain.



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**B** What is meant by index fossils ?

.....

.....

## Question 2

**Correct the underlined words :**

1. Petrified woods are considered from **rocks**. (.....)
2. **Nummulites** fossil is used in determination the age of sedimentary rocks. (.....)
3. **Ammonites** fossils indicate that the environment where they lived was clear warm shallow seas. (.....)
4. Ferns fossils indicate that the environment where they lived was **a sea floor**. (.....)
5. The trace is what the living organism leave **after its death** in the sedimentary rocks. (.....)
6. Worms' tunnels fossil is from **remains** of an old living organisms. (.....)

## Question 3

**A** Give reasons for :

1. Geologists search for foraminifera and radiolaria fossils.

.....

.....

2. El-Mokattam's mountain was a part of a sea floor more than 35 million years ago.

.....

.....

**B** Mention one use for :

1. Index fossils.

.....

2. Fossils.

.....



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PART 1

## Question 4

**Choose the correct answer :**

1. Not all the fossils are considered index fossils, because they are characterized by .....
   a. a long period of time and a limited geographic distribution.
   b. a short period of time and a wide geographic distribution.
   c. a long period of time and a wide geographic distribution.
   d. a short period of time and a limited geographic distribution.
2. The fossil record points to the evolution of life from simple to complex in the plants and the proof is that .....
   a. the angiosperms appeared before gymnosperms.
   b. the ferns appeared before mosses.
   c. the algae appeared before mosses and ferns.
   d. the mosses appeared before the algae.
3. The fossils that exist in the sedimentary rocks of El-Mokattam's mountain are ..... fossils.
   a. ferns b. coral c. nummulites d. all the previous answers
4. ..... is an example of microfossils.
   a. Mammoth b. Ferns c. Foraminifera d. Coral

## Question 5

**Choose from column (B) what suits in column (A) :**

| (A) | (B) |
|---|---|
| 1. Fossils indicate the details of the life of an old plant. | a. Radiolaria. |
| 2. A fossil indicates the suitable conditions for petroleum formation. | b. Archaeopteryx. |
| 3. A fossil is considered a link between reptiles and birds. | c. Corals. |
| 4. Invertebrate fossil was appeared before vertebrates on the life stage. | d. Petrified woods. |
| | e. Dinosaurs. |



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# UNIT THREE

## Lesson 2 Extinction

### Worksheet 19

### Question 1

**A Choose the correct answer :**

1. ..... indicate(s) extinction.

   a. Evolution  b. Protectorates  c. Fossils  d. Ecological equilibrium

2. Which of the following statements is the most accurate in describing the concept of extinction ? .....

   a. The date of death of the last individual from the members of the same species.

   b. The continuous decrease in the number of the same species without compensation.

   c. The path of energy that transmits from a living organism to another in the ecosystem.

   d. All living organisms and non-living components in the environment.

**B What is meant by ... ?**

- Extinction : .....

.....

### Question 2

**A Mention the causes of the macro extinction :**

.....

.....

.....

**B Look at the pictures of these land animals, then mention the name of each one and classify it as extinct or endangered :**



(1) .....

.....



(2) .....

.....



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(3) .....
.....



(4) .....
.....

## Question 3

**A Complete the following statements :**

1. ..... is from endangered birds.
2. ..... is an example of endangered plants in Egypt which is used by pharaohs in manufacturing .....
3. ..... is from extinct mammals, while ..... is from endangered mammals.
4. ..... is from recently extinct birds, while ..... is from recently extinct mammals.
5. From the extinct animals in the old ages are ..... and .....

**B Read these statements, then answer the following questions :**

a. A bird its head is covered with white feathers.

b. A non-flying bird.

**Questions :**

1. Name each species ?

.....

2. Determine if it is extinct or endangered ?

.....

.....

## Question 4

**A Give a reason for :**

The dodo bird is an easy target to be hunt.

.....



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Ⓑ Mention one difference between dodo bird and bald eagle.

| Dodo bird | Bald eagle |
|---|---|
| ..... | ..... |
| ..... | ..... |

## Question 5

Correct the underlined words :

1. The **desert environment** is an example of complicated ecosystem organisms on land. (.....)
2. **Quagga** is from the most famous extinct species in the old times. (.....)
3. **Dinosaurs** are considered from the extinct species in the recent times. (.....)
4. **Passenger immigrating (pigeon)** is from birds that can't fly due to the reduced size of its wings. (.....)

# Exercise 20

## Question 1

Ⓐ Mention three ways to protect living organisms from extinction.

.....

.....

.....

Ⓑ Give a reason for :

1. Complicated ecosystem is not affected by absence of one of its species.

.....

2. The desert is a simple ecosystem.

.....

## Question 2

Mention one difference between complicated and simple ecosystems.

| Complicated ecosystem | Simple ecosystem |
|---|---|
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |



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PART 1

## Question 3

**Complete the following table :**

| Protectorate | Location | Protected kinds |
|---|---|---|
| (1) ..... | South Sinai governorate | ..... |
| | | ..... |
| (2) Panda protectorate | ..... | ..... |
| (3) ..... | ..... | Grey bear |

## Question 4

**A What is meant by ... ?**

1. Natural protectorates : .....
.....
2. Food chain : .....
3. The simple ecosystem : .....
.....

**B Choose from the following scientific terms what is suitable for the short statements :**

| Scientific terms | The statements |
|---|---|
| 1. The protectorate of petrified forests in Qattamiya. | a. present in nature shaped as a chin. |
| 2. The protectorate of Nile islands in Aswan. | b. in which, the grey bear is protected. |
| 3. Bluestone protectorate. | c. located in northeastern China. |
| 4. Panda protectorate. | d. in which, ibis birds are reproduced. |
| 5. Wadi Hetan, part of Wadi El-Raiyan protectorate in El-Fayoum. | e. in which, the petrified woods are found over 35 million years. |
| 6. Ras Mohamed protectorate. | f. formed from limestone rocks. |
| 7. El-Mokattam's mountain region. | g. the best world heritage areas of whales' skeletons. |

1. ..... 2. ..... 3. ..... 4. .....
5. ..... 6. ..... 7. .....

## Question 5

**Put (✓) or (✗) :**

1. Wadi El-Raiyan is the first established protectorate in Egypt in 1983. ( )
2. Tropical forest is an example of complicated ecosystem. ( )
3. Bluestone protectorate is found in northeastern china. ( )



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# General Exercise of the School Book ? on Unit THREE

## 1 Choose the correct answer :

1. Fossils are often found in ..... rocks.

a. metamorphic b. sedimentary c. volcanic d. igneous

2. All of the following are endangered species except .....

a. panda. b. bald eagle. c. quagga. d. rhinoceros.

3. All of the following are natural disasters that threaten living organisms except .....

a. floods. b. volcanoes. c. drought. d. global warming.

## 2 Define each of the following :

1. Fossils : .....

.....

2. Index fossil : .....

.....

3. Natural protectorates : .....

.....

## 3 Correct the following statement without changing the underlined phrases :

1. The first discovered fossil of **mammoth** were found preserved in amber.

.....

2. **Ferns fossils** indicate that they lived in mild environment.

.....

3. **Destroying the habitat** is one of the factors that contribute to species adaptation.

.....

## 4 Mention three ways to protect living organisms from extinction :

.....

.....

.....

## 5 Give reasons for :

1. Petrified woods are considered from fossils although they look like rocks.

.....

.....



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PART 1

2. Fossils are important in petroleum exploration.

.....

.....

3. The simple ecosystem is significantly affected by the absence of one of its species.

.....

.....

**6 Which does each of the following represent (mold or cast) .... ?**

1. The mask of superman : .....
2. Wax Museum statues in Helwan : .....
3. Cubes of ice : .....
4. Models of clothes shows : .....

RaNia SaYed



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# Model Exams on Unit THREE

## Model Exam 1

20

**Answer the following questions :**

### Question 1 5 marks

**Choose the correct answer :**

1. ..... is an example of complete body fossils.

a. Mammoth fossil b. Ammonites fossil

c. Nummulite fossil d. Trilobite fossil

2. The ..... replaces the wood material part by part of an old tree.

a. plastic b. iron c. silica d. copper

3. ..... indicate (s) the age of sedimentary rocks.

a. Ferns fossils b. Coral fossils c. Fossil record d. Index fossils

4. All of the following are extinct species expect .....

a. dodo bird. b. quagga. c. dinosaur. d. panda bear.

5. ..... is considered a link between reptiles and birds.

a. Archeoptyrex b. Algae c. Gymnosperms d. Angiosperms

### Question 2 5 marks

**A Put (✓) or (✗) , then correct what is wrong :**

1. The area of petrified forests in Qattamia is called the wood mountain.

( ) .....

2. Coral fossils indicate that the environment, where they lived was hot and rainy.

( ) .....

3. Dinosaur and mammoth are examples of extinct species in recent times.

( ) .....



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PART 1

**B Give reasons for :**

1. Snow is suitable medium for formation of complete body fossil.

.....

2. Panda protectorate is an important protectorate.

.....

## Question 3 5 marks

**A Complete the following :**

1. ..... was used by pharaohs in manufacturing of writing papers.
2. ..... is the process of replacing the wood material of trees by silica.
3. ..... and ..... are examples of extinct species.
4. Algae appeared before ..... and .....

**B What happens if .... ?**

1. An organism is buried fast after death in snow.

.....

2. Silica matter replaces wood material part by part of an old tree.

.....

## Question 4 5 marks

**A Compare between :**

Simple ecosystem and complicated ecosystem.

| Simple ecosystem | Complicated ecosystem |
|---|---|
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |
| ..... | ..... |

**B Fossils are important because they help in :**

1. .....
2. .....
3. .....
4. .....



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# Model Exam 2

20

**Answer the following questions :**

## Question 1 — 5 marks

**Complete the following statements :**

1. ..... is from the mammals that appeared after reptiles.
2. ..... indicate that the environment, where they lived was clear warm.
3. ..... and ..... are examples of complete body fossils.
4. Simple ecosystem has ..... and it is ..... by the absence of one of its species.
5. Bald eagle is from ..... species.
6. Fossils are ..... and ..... of old living organisms that are preserved in sedimentary rocks.
7. ..... is the first established protectorate in Egypt.

## Question 2 — 5 marks

**A Choose the correct answer :**

1. ..... is from extinct species.

a. Panda bear b. Rhinoceros c. Quagga d. Ibis bird

2. ..... is the date of death of the last individual of the species.

a. Moment of extinction b. Extinction

c. Old extinction d. Recent extinction

3. ..... indicates the extinction and evolution of organisms.

a. Index fossil b. Fossil

c. Fossil record d. No correct answer

**B What happens if ... ?**

1. Dipping the old insects in amber.

.....

2. The absence of one type of species from the simple ecosystem.

.....



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PART 1

## Question 3 — 5 marks

**A Correct the underlined words :**

1. **Dodo Birds** is an endangered species.

.....

2. Reptiles appeared before **amphibians**.

.....

3. In petrification **plastic** replaced the wood material.

.....

**B Give reasons for :**

1. Importance of fossils in petroleum exploration.

.....

.....

2. Establishing gene banks of endangered species.

.....

.....

## Question 4 — 5 marks

**A Mention two examples of protectorates in Egypt :**

1. .....

2. .....

**B Desert is a simple ecosystem. Explain.**

.....

.....

**C What is meant by trace ?** .....

.....



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PART 2

# Final Revision



هذا العمل خاص بموقع ذاكرولى التعليمى ولا يسمح بتداوله على مواقع أخرى

# Final Revision on Unit 1

## 1 Definitions (or scientific terms) :

| | |
|---|---|
| **1. Mendeleev's periodic table :** | * It is the first real periodic table for classifying elements.<br>* It is a table in which the elements are arranged in an ascending order according to their atomic weights. |
| **2. Moseley's periodic table :** | It is a table in which the elements are arranged in an ascending order according to their atomic numbers. |
| **3. Modern periodic table :** | It is a table in which the elements are arranged in an ascending order according to the atomic numbers and the way of filling the energy sublevels with electrons. |
| **4. The group :** | It is a partition in the periodic table containing elements having similar properties in vertical column. |
| **5. The period :** | It is a partition in the periodic table containing elements having the same number of energy levels in horizontal row. |
| **6. Atomic number :** | * It is the number of protons inside the nucleus of the atom of an element.<br>* It is the sum of the numbers of electrons rotating in energy levels around the nucleus of the atom of an element. |
| **7. Picometer :** | * It is the measuring unit of the atomic size of the element.<br>* It is a part from million of the million part of a metre. |
| **8. Electronegativity :** | It is the ability of the atom in covalent molecule to attract the electrons of the chemical bond towards itself. |
| **9. Polar compounds :** | They are covalent compounds in which the difference in electronegativity between their elements is relatively high. |
| **10. Metals :** | * They are the elements which have less than four electrons in their outermost energy levels.<br>* They are the elements which tend to lose their outermost electrons and change into positive ions during the chemical reaction. |
| **11. Positive ion :** | It is an atom of metallic element that loses one electron or more during the chemical reaction. |
| **12. Nonmetals :** | * They are the elements which have more than four electrons in their outermost energy levels.<br>* They are the elements which tend to gain electrons and change into negative ions during the chemical reaction. |



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| | |
|---|---|
| **13. Negative ion :** | It is an atom of nonmetallic element that gains an electron or more during the chemical reaction. |
| **14. Metalloids :** | They are the elements which have the properties of both metals and nonmetals, like Boron, Silicon, Germanium, Arsenic, Antimony and Tellurium. |
| **15. Basic oxides :** | They are metallic oxides, some of them dissolve in water forming alkaline solutions. |
| **16. Acidic oxides :** | They are nonmetallic oxides which dissolve in water forming acidic solutions. |
| **17. Chemical activity series :** | It is a series in which metals are arranged in a descending order according to their chemical activity. |
| **18. Hydrogen bond :** | It is a weak electrostatic attraction force that arises between the molecules of polar compounds. |
| **19. Water pollution :** | It is addition of any substance to the water which causes continuous gradual change in water properties affecting the health and the life of living creatures. |

## 2 Important laws and solved problems :

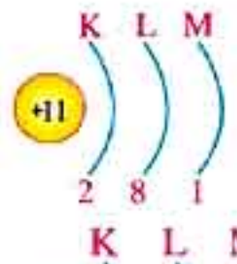
**1 Determination the location of elements in the modern periodic table.**

- The period number of the element = number of energy levels occupied by electrons in its atom.
- The group number of the element = number of electrons in the outermost energy level in its atom.

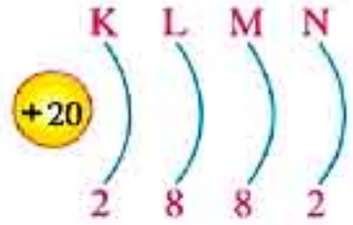
**Problem** ***Locate the position of the following elements in the modern periodic table :***

**1.** $_{11}Na$ **2.** $_{20}Ca$ **3.** $_{10}Ne$

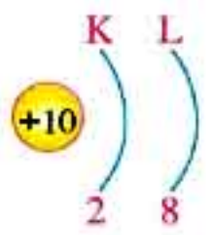
***Solution***

**1.** 

Period (3)
Group (1A)

**2.** 

Period (4)
Group (2A)

**3.** 

Period (2)
Group (0)



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PART 2

**2 The atomic number of an element = the sum of the numbers of electrons rotating in its energy levels.**

**Problem** ***Calculate the atomic number of :***

***1. Element (X) which locates in period (2) and group (3A).***

***2. Element (Y) which locates in period (3) and group (0).***

**Solution**

**1.** Element (X)

∵ It lies in period (2).

∴ Its electrons are distributed in two energy levels.

| K | L |
|---|---|
| 2 | 3 |

∵ It lies in group (3A).

∴ The outermost energy level contains 3 electrons.

∴ The atomic number of element (X) = 2 + 3 = 5

**2.** Element (Y)

∵ It lies in period (3).

∴ Its electrons are distributed in three energy levels.

| K | L | M |
|---|---|---|
| 2 | 8 | 8 |

∵ It lies in group zero.

∴ The outermost energy level contains 8 electrons.

∴ The atomic number of element (Y) = 2 + 8 + 8 = 18

**3 Water electrolysis :**

– The volume of hydrogen gas = 2 × the volume of oxygen gas.

**Problem** ***Calculate the volume of hydrogen gas that evolves at the negative pole if you know that the volume of oxygen gas that evolves at the positive pole of Hofmann's voltameter is 4 $cm^3$.***

**Solution**

Volume of hydrogen gas = 2 × volume of oxygen gas = 2 × 4 = 8 $cm^3$.

## 3 Importance or uses :

| Item | Importance or use |
|---|---|
| **1. Baking powder :** | Cleaning of silver tools. |
| **2. Sodium (liquid state) : (metal)** | It is used in transferring heat from inside the nuclear reactor to outside. This heat is used to obtain the vapour energy required to generate electricity. |



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| | |
|---|---|
| **3. Cobalt $^{60}Co$ : (transition element)** | It is used in food preservation. |
| **4. Silicon $_{14}Si$ : (metalloid)** | Silicon slides are used in the manufacture of electronics such as computer. |
| **5. Liquefied nitrogen : (nonmetal)** | It is used in the preservation of cornea of the eye. |
| **6. Hofmann's voltameter :** | It is used in electrolysis of acidified water. |

## 4 Important tables :

### 1 Important numbers :

| | |
|---|---|
| **1.** No. of elements in Mendeleev's periodic table. | 67 |
| **2.** No. of elements in modern periodic table. | 118 |
| **3.** No. of available elements in Earth's crust. | 92 |
| **4.** No. of groups of modern periodic table. | 18 |
| **5.** No. of periods of modern periodic table. | 7 |
| **6.** The angle between two single covalent bonds in water molecule. | 104.5° |
| **7.** Boiling point of water. | 100°C |
| **8.** Freezing point of water. | 0°C |
| **9.** Boiling point of liquid nitrogen. | - 196°C |

### 2 The reaction of metals with water depends on the position of the metal in chemical activity series :

| Metals | | Reaction with water |
|---|---|---|
| **Potassium** | **K** | They react instantly with water and hydrogen gas is evolved which burns with a pop sound. |
| **Sodium** | **Na** | |
| **Calcium** | **Ca** | They react very slowly with cold water. |
| **Magnesium** | **Mg** | |
| **Zinc** | **Zn** | They react with hot water vapour at high temperature only. |
| **Iron** | **Fe** | |
| **Copper** | **Cu** | They don't react with water. |
| **Silver** | **Ag** | |



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### 3 The physical state of halogens :

| Halogen : | Fluorine | Chlorine | Bromine | Iodine |
|---|---|---|---|---|
| Physical state | Gas | | Liquid | Solid |

## 5 Important equations :

1. $Mg + 2HCl \xrightarrow{Dil.} MgCl_2 + H_2\uparrow$
   Magnesium + Hydrochloric acid → Magnesium chloride + Hydrogen gas
2. $2Mg + O_2 \xrightarrow{\Delta} 2MgO$
   Magnesium + Oxygen → Magnesium oxide
3. $MgO + H_2O \longrightarrow Mg(OH)_2$
   Magnesium oxide + Water → Magnesium hydroxide
4. $C + HCl \xrightarrow{Dil.}$ No reaction
   Carbon + Hydrochloric acid
5. $C + O_2 \xrightarrow{\Delta} CO_2$
   Carbon + Oxygen → Carbon dioxide
6. $CO_2 + H_2O \longrightarrow H_2CO_3$
   Carbon dioxide + Water → Carbonic acid
7. $2Na + 2H_2O \longrightarrow 2NaOH + H_2\uparrow$
   Sodium + Water → Sodium hydroxide + Hydrogen gas
8. $2K + 2H_2O \longrightarrow 2KOH + H_2\uparrow$
   Potassium + Water → Potassium hydroxide + Hydrogen gas
9. $2K + Br_2 \longrightarrow 2KBr$
   Potassium + Bromine → Potassium bromide
10. $2Na + Cl_2 \longrightarrow 2NaCl$
    Sodium + Chlorine → Sodium chloride
11. $Cl_2 + 2KBr \longrightarrow 2KCl + Br_2$
    Chlorine + Potassium bromide → Potassium chloride + Bromine
12. $Cl_2 + 2NaBr \longrightarrow 2NaCl + Br_2$
    Chlorine + Sodium bromide → Sodium chloride + Bromine



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13 $Br_2$ + $2KI$ ⟶ $2KBr$ + $I_2$

Bromine — Potassium iodide — Potassium bromide — Iodine

14 $2H_2O \xrightarrow[\text{dil. } H_2SO_4]{\text{Electrolysis}} 2H_2\uparrow + O_2\uparrow$

## 6 Give reasons for :

1. **Scientists thought about classifying elements according to their properties.**
   To facilitate their study and find a relationship between elements and their chemical and physical properties.
2. **Mendeleev left gaps (spaces) in his periodic table.**
   Because he predicted the discovery of new elements.
3. **Mendeleev had to make disorder in the arrangement (in the ascending order) of atomic weights of some elements.**
   To put these elements in groups that suit their properties.
4. **Mendeleev had to consider the isotopes of one element are different elements.**
   Due to the difference in their atomic weights.
5. **Mendeleev had to put more than one element in one cell.**
   Due to the similarity in their properties.
6. **Moseley arranged elements in an ascending order according to their atomic numbers.**
   Because he discovered after studying x-rays properties that the periodic properties of elements are related to their atomic numbers and not their atomic weights.
7. **Mendeleev classified the elements of each group into two subgroups.**
   Due to the differences between their properties.
8. • **Elements of the same group have similar properties.**
   • **Properties of elements ($_{12}Mg$) and ($_{20}Ca$) are similar.**
   Because their atoms have the same number of electrons (two electrons) in the outermost energy level.
9. **Both sodium ($_{11}Na$) and potassium ($_{19}K$) are located in the same group.**
   Because their atoms have the same number of electrons (one electron) in the outermost energy level.
10. **Both lithium ($_{3}Li$) and nitrogen ($_{7}N$) are located in the same period.**
    Because their atoms have the same number of energy levels (2 levels) occupied by electrons.
11. **Scientists cannot discover a new element between sulphur ($_{16}S$) and chlorine ($_{17}Cl$).**
    Because the atomic number of each element is an integer and it increases than its preceding one in the same period by one.



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12. • **In periods, by increasing the atomic number, the atomic size decreases.**
    • **The atomic size of ($_3$Li) is greater than that of ($_4$Be).**
    Because the attraction force between the positive nucleus and the outermost electrons increases through the period by increasing the atomic number (by going from left to right).

13. • **By increasing the atomic number within groups, the atomic size increases.**
    • **The atomic size of ($_{11}$Na) is greater than that of ($_3$Li).**
    Due to the increase of the number of energy levels through the group by increasing the atomic number (on going from up to down).

14. **Water and ammonia are polar covalent compounds.**
    Because the difference in electronegativity between the elements forming their molecules is relatively high.

15. **Water is more polar than ammonia.**
    Because the difference in electronegativity between oxygen and hydrogen is greater than that between nitrogen and hydrogen.

16. **Sodium ($_{11}$Na) atom tends to form a positive ion, while chlorine ($_{17}$Cl) atom tends to form a negative ion.**
    Because sodium atom loses the outermost electron forming positive ion, while chlorine atom gains an electron forming negative ion.

17. **Both sodium ion ($Na^+$) and fluoride ion ($F^-$) have the same number of electrons.**
    Because during chemical reactions, sodium ($_{11}$Na) atom loses one electron and fluorine ($_9$F) atom gains one electron so, the number of electrons becomes 10 electrons in both ions.

18. **In metallic groups, the metallic property increases as we go from the top to the bottom.**
    Because the atomic size increases by increasing the atomic numbers in the same group.

19. **In nonmetallic groups, the nonmetallic property decreases as we go from the top to the bottom.**
    Due to the decrease of electronegativity by increasing the atomic numbers in the same group.

20. • **Cesium (Cs) is the most metallic element.**
    • **Cesium (Cs) is the most active metal in the periodic table.**
    Because it has the largest atomic size, so it can lose its valency electrons easily.

21. **Metallic property of potassium element ($_{19}$K) is more than that of sodium element ($_{11}$Na).**
    Because the metallic property increases gradually by increasing the atomic numbers of the elements in the same group.

22. **Nonmetallic property of oxygen element ($_8$O) is more than that of nitrogen ($_7$N).**
    Because the nonmetallic property increases gradually by increasing the atomic numbers of the elements in the same period.



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**23. We can use dilute HCl to differentiate between carbon and magnesium.**

Because magnesium is a metal which reacts with dilute HCl and hydrogen gas evolves, while carbon is a nonmetal which doesn't react with HCl.

$Mg + 2HCl \xrightarrow{Dil.} MgCl_2 + H_2\uparrow$

**24. Solution of magnesium oxide in water turns the violet litmus solution into blue.**

Because magnesium oxide dissolves in water giving magnesium hydroxide (alkaline solution) which turns litmus solution into blue.

$MgO + H_2O \longrightarrow Mg(OH)_2$

**25. We can use water to differentiate between calcium and zinc.**

Because calcium can react with cold water, while zinc reacts with hot water vapour at high temperature only.

**26. Nonmetal oxides are known as acidic oxides.**

Because they dissolve in water forming acids.

**27. Solution of carbon dioxide in water turns the violet litmus solution into red.**

Because it dissolves in water forming carbonic acid which turns litmus solution into red.

$CO_2 + H_2O \longrightarrow H_2CO_3$

**28. Elements of group (1A) are known as alkali metals.**

Because they react with water forming alkaline solutions.

**29. Lithium floats on water surface, while cesium sinks in water.**

Because the density of lithium is less than that of water, while the density of cesium is greater than that of water.

**30. Alkali metals are monovalent elements.**

Because their atoms have only one electron in their outermost energy level.

**31. Sodium is kept under the surface of kerosene.**

To prevent it from the reaction with moist air as it is an active metals.

**32. Lithium ($_3$Li) is the least active metal in group (1A).**

Because it has the least atomic size in group (1A).

**33. Sodium fires are not put off with water.**

Because sodium reacts instantly with water and hydrogen gas evolves which burns with a pop sound.

$2Na + 2H_2O \longrightarrow 2NaOH + H_2\uparrow$

**34. Potassium is more active than sodium.**

Because the atomic size of potassium is larger than that of sodium.

**35. The reaction of potassium with water is more strongly than that of sodium.**

Because potassium is more active than sodium.



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**36. Elements of group (7A) are known as halogens.**

Because they react with metals forming salts, where halogens mean "Forming salts".

**37. Halogens are monovalent.**

Because they tend to gain one electron during chemical reaction.

**38. • Halogens exist in the form of diatomic molecules.**

**• Halogens do not exist in nature in elementary state.**

Because they are active elements.

**39. Bromine can't replace chlorine in its salt solution.**

Because bromine is less active than chlorine.

**40. Liquid sodium is used in nuclear reactors.**

Because it is a good conductor of heat which transfers the heat from inside the nuclear reactor to outside it to obtain vapour energy which generate electricity.

**41. ($^{60}Co$) is used in food preservation.**

Because it emits gamma rays which prevent the reproduction of microbial cells.

**42. Silicon is used in the manufacture of electronics.**

Because it is semi-conductor, its ability to conduct electricity depends on the temperature.

**43. The importance of liquefied nitrogen in the medical fields.**

Because it is used in the preservation of cornea of the eye.

**44. Liquefied nitrogen is used in preservation of cornea of eye.**

Due to the decrease of its boiling point (– 196°C).

**45. Water has several uses.**

Because it used in agricultural fields, industrial fields and personal fields.

**46. The high boiling point of water.**

Due to the presence of hydrogen bonds between water molecules.

**47. The presence of hydrogen bonds between water molecules.**

Because water is a polar compound due to the higher electronegativity of oxygen with respect to hydrogen.

**48. Water has the ability to dissolve most ionic compounds.**

Because water is a good polar solvent.

**49. Dissolving of sugar in water although it is from covalent compounds.**

Because sugar molecules can make hydrogen bonds with water molecules.

**50. Oil doesn't dissolve in water.**

Because it is a covalent compound which can't make hydrogen bonds with water, so it doesn't dissolve in it.

**51. Ice floats on the water surface.**

Because the density of ice is less than the density of water.



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**52. Although water of oceans freezes at polar zones, the aquatic creatures are still alive.**
Because when the temperature of water decreases than 4°C, it forms a layer of ice which floats on water surface and this provides the creatures the chance to still alive.

**53. On putting a glass bottle completely filled with water in a freezer, it will break.**
Because when water freezes, its volume increases and the pressure inside the bottle increases.

**54. Adding few drops of dilute sulphuric acid to water during its electrolysis by Hofmann's voltameter.**
Because pure water is a bad conductor of electricity, but acidified water conducts electricity.

**55. The glowing of splint increases by approaching it to the anode of Hofmann's voltameter during electrolysis of acidified water.**
Because oxygen gas which increases the glowing evolves at the anode.

**56. Chemical water pollution is more dangerous than biological pollution.**
Because chemical water pollution causes dangerous diseases such as the death of brain cells, blindness and liver cancer.

**57. We should keep water free from any pollution.**
To protect ourselves from dangerous diseases caused by water pollution.

**58. It is dangerous to eat fish containing high concentration of lead.**
Because this leads to death of brain cells.

**59. Death of marine creatures in the water areas in which the water used in cooling the nuclear reactors.**
Due to the separation of the dissolved oxygen from water.

**60. We should not keep the tap water in plastic bottles.**
Because plastic reacts with chlorine gas which is used as water disinfectant leading to the increase in the infection rates by cancer.

## 7 What happens when ... ?

**1. Increasing the atomic number in group (1A) [concerning the atomic size].**
The atomic size increases.

**2. A metallic atom loses one electron or more during the chemical reaction.**
It changes into a positive ion.

**3. A nonmetallic atom gains one electron or more during the chemical reaction.**
It changes into a negative ion.

**4. We go from up to down inside the group (1A).**
The atomic number increases, the atomic size increases and the metallic property increases.



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**5. Adding dil. HCl to a piece of magnesium.**

Magnesium chloride is formed and hydrogen gas evolves as bubbles.

$$Mg + 2HCl \xrightarrow{Dil.} MgCl_2 + H_2\uparrow$$

**6. Burning a magnesium strip inside a test tube contains oxygen.**

It burns with a bright light and a substance (magnesium oxide) is formed.

$$2Mg + O_2 \xrightarrow{\Delta} 2MgO$$

**7. Dissolving magnesium oxide in water.**

It dissovles in water giving magnesium hydroxide.

$$MgO + H_2O \longrightarrow Mg(OH)_2$$

**8. Adding the violet litmus solution to magnesium oxide.**

The solution turns into blue.

**9. Adding the violet litmus solution to a jar containing a piece of burning coal.**

The solution turns into red.

**10. Putting a glass bottle filled with water in the freezer for a long time.**

It will be broken.

**11. Decreasing of water temperature to 4°C.**

The water molecules are collected together by hydrogen bonds forming ice crystals of hexagonal shape and large volume.

**12. Decomposing of water into its two elements by heating.**

There isn't aqueous solutions inside the cells of living organisms.

**13. Passing of electric current through Hofmann's voltameter containing acidic water.**

The acidified water decomposes into oxygen gas evolves at the anode and hydrogen gas evolves at the cathode. The ratio between the produced hydrogen gas and oxygen gas is about (2 : 1) by volume.

**14. Pollution of water with animal and human wastes.**

The infection by many diseases such as bilharzia, typhoid and hepatitis.

**15. Storing water in plastic bottles.**

Plastic reacts with chlorine gas (used as water disinfectant) leading to the increase in the infection rates by cancer.

**16. Throwing synthetic cleaning substances in water.**

This leads to increase the concentration of some elements causing great harms.

**17. Increasing the ratio of arsenic in food.**

It increases the infection rate by liver cancer.

**18. Increasing the concentration of mercury in drinking water.**

It causes blindness.

**19. Eating fish contains high concentration of lead.**

It causes the death of brain cells.



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## 8 Comparisons :

### 1 Attempts of elements classification.

| Mendeleev's periodic table | Moseley's periodic table | Modern periodic table |
|---|---|---|
| Elements are classified in an ascending order according to their atomic weights. | Elements are classified in an ascending order according to their atomic numbers. | Elements are classified in an ascending order according to :<br>• their atomic numbers.<br>• the way of filling the energy sublevels with electrons. |

### 2 Main energy levels and energy sublevels.

| Points of comparison | Main energy levels | Energy sublevels |
|---|---|---|
| • Their number in the heaviest atom known till now : | 7 | 4 |
| • They are symbolized by : | K , L, M, N, O, P and Q | s, p, d and f |

### 3 s-block and p-block.

| Points of comparison | s-block | p-block |
|---|---|---|
| • Its location in the periodic table : | on the left side | on the right side |
| • It includes : | two groups (1A) and (2A) | six groups (3A), (4A) , (5A), (6A) , (7A) and (0) |

### 4 d-block and f-block.

| Points of comparison | d-block | f-block |
|---|---|---|
| • Its location in the periodic table : | in the middle | below the periodic table. |
| • It includes : | transition elements | lanthanides and actinides. |



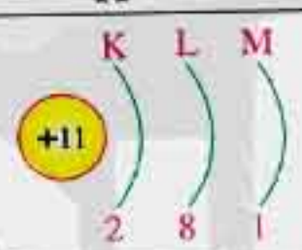
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## 5 Period and group.

| Period | Group |
|---|---|
| - It includes elements of different properties.<br>- Its elements have the same number of energy levels.<br>- By increasing the atomic number for its elements :<br>• The atomic size decreases.<br>• The metallic property decreases till we reach metalloid, then the nonmetallic property increases. | - It includes elements of similar properties.<br>- Its elements have the same number of electrons in the outermost energy level.<br>- By increasing the atomic number for its elements :<br>• The atomic size increases.<br>• The metalic property increases gradually as we go from top to bottom as in group (1A).<br>• The nonmetallic property decreases gradually as we go from top to bottom as in group (7A). |

## 6 Sodium ($_{11}Na$) element and chlorine ($_{17}Cl$) element.

| Points of comparison | $_{11}Na$ | $_{17}Cl$ |
|---|---|---|
| • Electronic configuration of the atom : |   |   |
| • Group no. : | (1 A) | (7 A) |
| • Period no. : | 3 | 3 |
| • Block : | s | p |

## 7 The positive ion (cation) and the negative ion (anion) :

| The positive ion (cation) | The negative ion (anion) |
|---|---|
| - It is an atom of a metallic element that lost one electron or more during the chemical reactions.<br>- It carries positive charges equal to the number of lost electrons.<br>- The number of energy levels in it is less than the number of energy levels in its atom.<br>- The number of its protons is more than that of its electrons.<br>- Its electronic structure is similar to that of the nearest preceding inert gas.<br>- *Ex. : $Na^{+}$ , $Mg^{+2}$ , $Al^{+3}$* | - It is an atom of a nonmetallic element that gained one electron or more during the chemical reactions.<br>- It carries negative charges equal to the number of gained electrons.<br>- The number of energy levels in it is equal to the number of energy levels in its atom.<br>- The number of its electrons is more than that of its protons.<br>- Its electronic structure is similar to that of the nearest inert gas that follows.<br>- *Ex. : $Cl^{-}$ , $O^{-2}$ , $P^{-3}$* |



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## 8 Metals and nonmetals.

| Metals | Nonmetals |
|---|---|
| - They are the elements which have less than four electrons in their outermost energy levels.<br>- They tend to lose electrons and change into (+ve) ions.<br>- They are characterized by largest atomic sizes.<br>- Some of them react with dilute acids forming salt of acid and hydrogen gas.<br>- They react with oxygen forming basic oxides. | - They are the elements which have more than four electrons in their outermost energy levels.<br>- They tend to gain electrons and change into (–ve) ions.<br>- They are characterized by smallest atomic sizes.<br>- They don't react with dilute acids.<br>- They react with oxygen forming acidic oxides. |

## 9 Basic oxides and acidic oxides :

| Basic oxides | Acidic oxides |
|---|---|
| - They are metal oxides.<br>- They are formed by the reaction of metal with oxygen.<br>- Some of them dissolve in water giving alkalis.<br>- Their solutions turn litmus solution into blue.<br>– *Ex.* : MgO and $Na_2O$ | - They are nonmetal oxides.<br>- They are formed by the reaction of nonmetal with oxygen.<br>- They dissolve in water giving acids.<br>- Their solutions turn litmus solution into red.<br>– *Ex.* : $CO_2$ |

## 10 Fluorine ($_9F$) and cesium ($_{55}Cs$).

| Points of comparison | Fluorine ($_9F$) | Cesium ($_{55}Cs$) |
|---|---|---|
| • The kind of the element : | Halogen. | Alkali metal. |
| • Its position in the table : | Period (2) and group (7A). | Period (6) and group (1A) |
| • Chemical activity : | Active nonmetal. | Active metal. |

## 11 Alkali group and halogens group :

| Alkali group | Halogens group |
|---|---|
| - They are located on the left side of the modern periodic table.<br>- They are the first group (1A) of s-block.<br>- They include the strongest metals.<br>- They are good conductors of heat and electricity. | - They are located on the right side of the modern periodic table.<br>- They are elements of group (7A) in p-block.<br>- They include the strongest nonmetals.<br>- They are bad conductors of heat and electricity. |



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## 12 Natural and artificial environmental pollutants :

| Natural pollutants | Artificial pollutants |
|---|---|
| They arise from natural phenomenon such as :<br>- Volcanic eruptions.<br>- Death of living creatures.<br>- Lightning accompaning thunder storms. | They arise from different human activities such as :<br>- Burning coal and oil which leads to the formation of acidic rains and smog.<br>- The overuse of chemical insecticides and fertilizers.<br>- Throwing sewage and factories wastes and leakage of petroleum oil in the seas and rivers. |

## 13 Kinds of artificial water pollution :

| Points of comparison | Chemical pollution | Biological pollution | Radiant pollution | Thermal pollution |
|---|---|---|---|---|
| **1. It originates from :** | Discharging of factories residues and sewage in seas and rivers. | Mixing of animals and human wastes with water. | Dumping of atomic wastes in the oceans and seas. | Using some water areas in cooling the nuclear reactors. |
| **2. Its harms :** | * Blindness.<br>* Liver cancer.<br>* Death of brain cells. | * Bilharzia.<br>* Typhoid.<br>* Hepatitis. | ---------- | * Death of marine creatures. |

## 9 Activities :

### ACTIVITY 1 Magnesium oxide is a basic oxide.

**Steps :**

- Ignite one end of a magnesium strip until it burns, then put it in a jar filled with oxygen gas.
- Add some drops of water with some drops of violet litmus solution to the produced substance.

**Observations :**

- Magnesium strip burns with a bright light and magnesium oxide is formed.
- Magnesium oxide dissolves in water.
- Litmus solution turns into blue.



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### Conclusion :

- Magnesium oxide dissolves in water giving basic oxide which turns litmus solution into blue.

## Activity 2 Reaction of magnesium with dilute acid.

### Step :

Put a part of magnesium strip in a test tube and add some dilute hydrochloric acid (HCl).

### Observation :

A gas evolves with bubbles.

### Conclusion :

Magnesium reacts with dilute acid [HCl] giving magnesium chloride and hydrogen gas evolves.

## Activity 3 Carbon dioxide is an acidic oxide.

### Steps :

1. Burn a piece of coal in a burning spoon and put it after complete burning in a cylinder full of oxygen.
2. Add some water and drops of violet litmus solution to the cylinder.

### Observations :

- The glowing increases.
- Carbon dioxide dissolves in water.
- The solution turns into red.

### Conclusion :

Carbon dioxide dissolves in water giving acidic oxide which turns litmus solution into red.

## Activity 4 Reaction of nonmetals [such as carbon with dilute acids.

### Steps :

1. Put a piece of coal (carbon) in a test tube.
2. Add some dilute HCl to the tube.



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### Observation :

No reaction takes place.

### Conclusion :

Nonmetals [such as carbon] don't react with dilute acids.

## ACTIVITY 5 Potassium is more active than sodium.

### Steps :

1. Put the sodium piece in a beaker containing some water ***Fig. (a)***.
2. Repeat the above step using potassium instead of sodium ***Fig. (b)***.



***Fig. (a)***



***Fig. (b)***

### Observations :

- Both sodium and potassium react with water and hydrogen gas evolves which burns with a pop sound.
- The reaction of potassium with water is more strongly than that of sodium.

### Conclusion :

Potassium is more active than sodium.

## ACTIVITY 6 To prove that water is a good polar solvent.

### Steps :

1. Put an amount of water in three glass beakers.
2. Put a spoon of sugar in the first beaker and a spoon of table salt in the second and some drops of oil in the third with stirring.

### Observation :

Both sugar and table salt dissolve in water, while oil doesn't dissolve.



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### Conclusion :

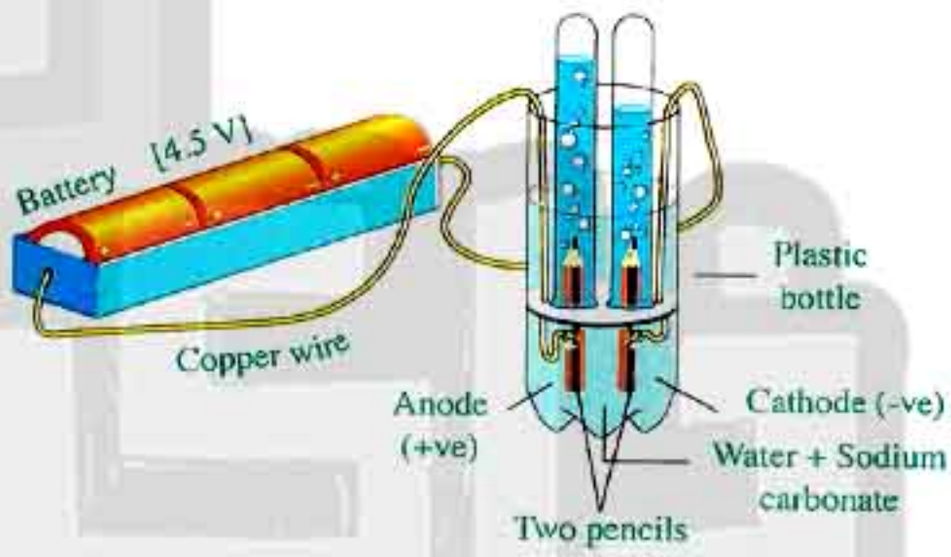
- Water is a good polar solvent so, it has a great ability to dissolve most ionic compounds such as table salt (sodium chloride).
- Water can also dissolve some covalent compounds such as sugar that can form hydrogen bonds with it.
- Some covalent compounds such as oil can't dissolve in water as they can't form hydrogen bonds with water.

## Activity 7 Potassium is more active than sodium.

### Steps :

Connect the circuit as shown in the figure, then close it for 10 min. :

1. Compare between the volume of the evolved gas above the negative pole (cathode) and the volume of the evolved gas above the positive pole (anode).
2. Approach a glowing splint to the gas evolved at both cathode and anode.




### Observations :

1. The volume of the evolved gas above the cathode doubled the volume of the evolved gas above the anode.
2. The evolved gas above the anode makes the glowing splint more glowing, while the evolved gas above the cathode burns with a blue flame and makes a pop sound.

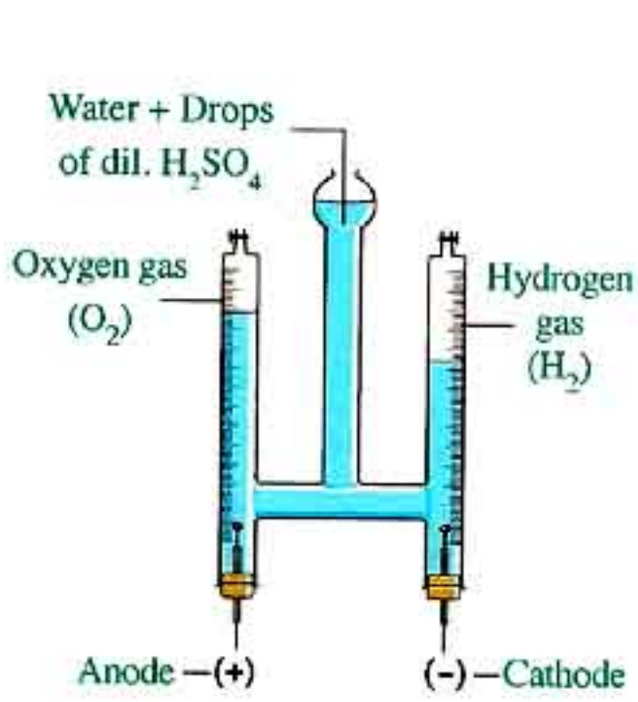
### Conclusion :

The acidified water decomposes by electricity into :

- **Oxygen gas** evolves at the **anode**.
- **Hydrogen gas** evolves at the **cathode**.

- The ratio between the produced hydrogen gas and oxygen gas is about (2 : 1) by volume because water molecule ($H_2O$) is composed of two hydrogen atoms and one oxygen atom.

$$2H_2O \xrightarrow[\text{dil. } H_2SO_4]{\text{Electrolysis}} 2H_2\uparrow + O_2\uparrow$$



"Hofmann's Voltameter"



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## 10 Main points :

### Lesson 1 Attempts of Elements Classification :

**1 Mendeleev :**

- He arranged elements of similar properties in vertical columns **(groups)**.
- He arranged elements in an ascending order according to their **atomic weights** in horizontal rows **(periods)** which were published in his book "Principles of Chemistry" in 1871
- He classified the elements of each group into two subgroups (A and B).

• ***He discovered that :***

- The atomic weights of elements increase (in non-uniform way) on moving from the left side of the table to the right side in horizontal rows **(periods)**.
- The properties of elements were repeated **periodically** by the beginning of each new period.

**** Advantages of Mendeleev's table :***

1. He left gaps (empty cells) in his table predicting the discovery of new elements.
2. He corrected the atomic weights of some elements which were estimated wrongly.

**** Disadvantages of Mendeleev's table :***

1. He had to make disorder in the arrangement in the ascending order of atomic weights of some elements to put them in groups that suit their properties.
2. He had to consider the isotopes of one element are different elements due to the difference in their atomic weights so, he had to put more than one element in one place (cell) of his table.

**2 Rutherford :**

He discovered that the nucleus of the atom contains positively charged protons.

**3 Moseley :**

- He discovered after studying X-rays properties that the periodic properties of elements are related to their atomic numbers and not to their atomic weights.

**** The most important modifications of Moseley on Mendeleev's table :***

1. He arranged elements in an ascending order according to their **atomic numbers**.
2. He added zero (0) group which includes inert (noble) gases to the table.
3. He specified a place below the table for lanthanides and actinides elements.

**4 Bohr :** He discovered the main energy levels of the atom.

**5 Modern periodic table :**

Elements are classified in an ascending order according to :

1. Their atomic numbers.
2. The way of filling the energy sublevels with electrons.



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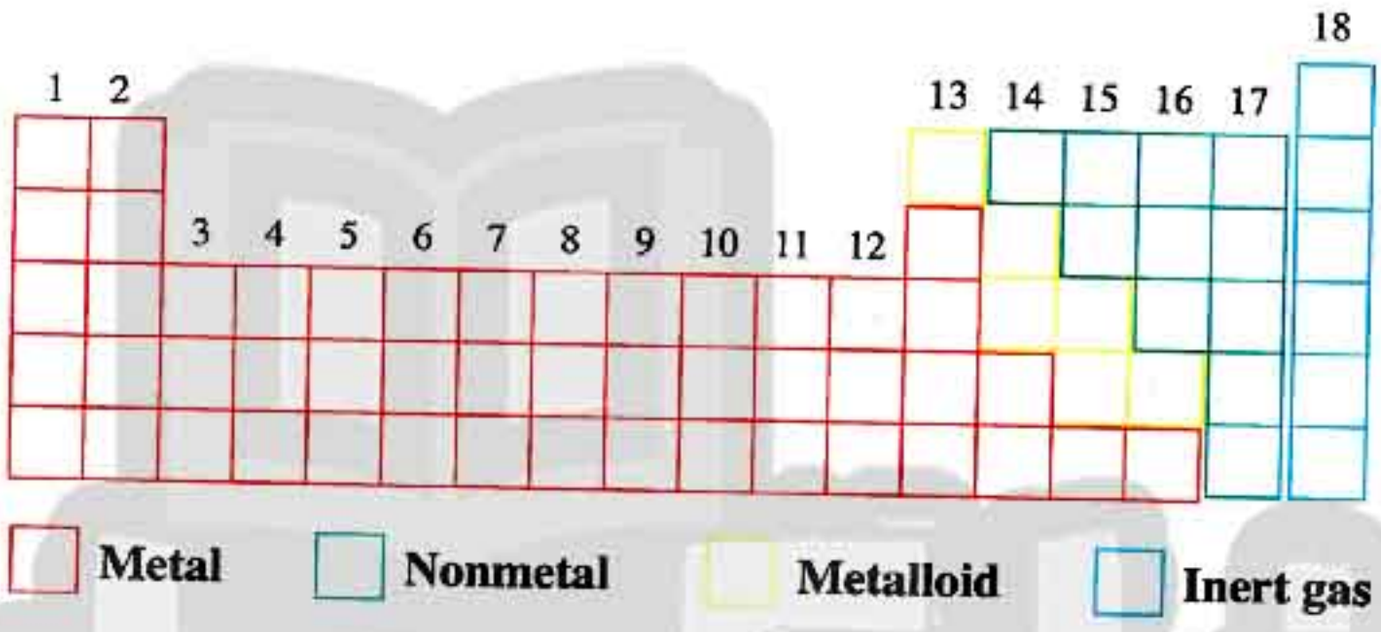
## Lesson 2 Graduation of the Properties of Elements in the Modern Periodic Table :

- The atomic radius is used as a measure for the atomic size of the atom and its measuring unit is **picometre**.

By increasing the atomic number

- The atomic size decreases.
- The nonmetallic property increases.
- The metallic property decreases.

- The atomic size increases.
- The metallic property increases.
- The nonmetallic property decreases.

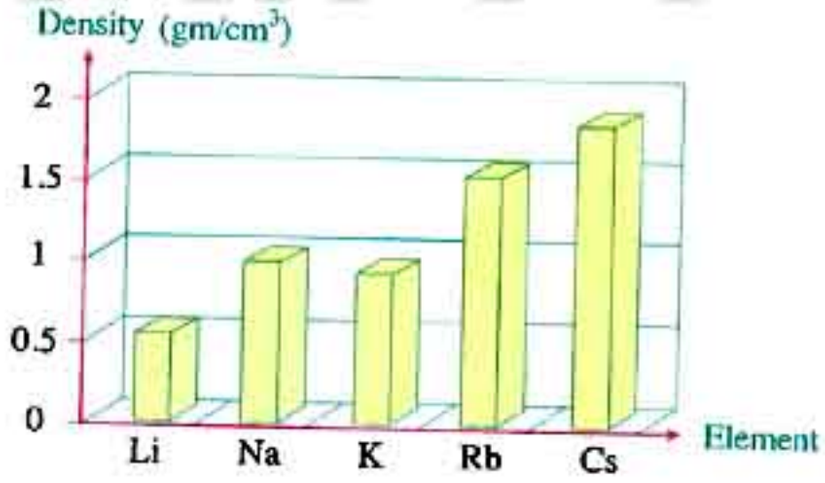



- **Cs** is the most metallic element in group (1A).
- **Li** is the least metallic element in group (1A).
- The most nonmetallic element is found in group (7A).

## Lesson 3 Main Groups in the Modern Periodic Table :

**The density of alkali metals :**

- Most of them have low density.
  - (Li), (Na) and (K) float on the water surface.
  - (Rb) and (Cs) sink in water.




## Lesson 4 Water :

- ***Importance of water*** :

- Water is very important for all living organisms and it has several uses in :
  - Agricultural fields.
  - Industrial fields.
  - Personal fields.



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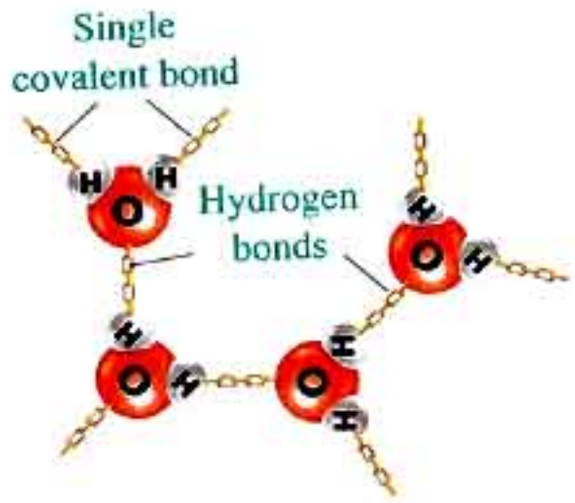
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- ***Structure of water :***

- Water molecule is formed by combination of one oxygen atom (O) with two hydrogen atoms (H) by two ***single covalent bonds***, the angle between them is 104.5°

- Due to the higher electronegativity of oxygen with respect to hydrogen , polar water molecules are linked together by "***hydrogen bonds***".




- ***Properties of water :***

**1 Physical properties :**

1. Water exists in three states which are solid state (ice), liquid state (water) and gaseous state (water vapour).
2. Water is a good polar solvent for most ionic compounds and some covalent compounds such as sugar.
3. Pure water boils at 100°C and freezes at 0°C.
4. Water density decreases on freezing.

**2 Chemical properties :**

1. Water has a neutral effect on litmus paper.
2. Electrolysis of water.

- ***Protection of water from pollution :***

1. Preventing of getting rid of sewage, wastes of factories and dead animals in rivers or canals.
2. Developing the stations of water purification and do a periodical analysis to water used in drinking.
3. Disinfection of the drinking water tanks which are found on the roofs of buildings in a periodical manner.
4. Don't store the tap water in empty plastic bottles, because plastic reacts with chlorine gas (used as water disinfectant) leading to the increase in the infection rates by cancer.
5. Spreading environmental awareness among people to protect water from pollution.



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# Final Revision on Unit 2

## 1 Definitions (or scientific terms) :

| | |
|---|---|
| **1. Atmospheric envelope of the Earth :** | It is a gaseous envelope rotating with the Earth around its axis and it extends about 1000 km. above sea level. |
| **2. Atmospheric pressure :** | It is the weight of air column of an atmospheric height on a unit area ($1m^2$). |
| **3. Normal atmospheric pressure :** | It is the atmospheric pressure at sea level and it equals 1013.25 mb |
| **4. Isobar :** | It is curved lines that join the points of equal pressure in atmospheric pressure maps. |
| **5. Tropopause :** | It is the region between troposphere and stratosphere layers. |
| **6. Stratopause :** | It is the region between stratosphere and mesosphere layers. |
| **7. Mesopause :** | It is the region between mesosphere and thermosphere layers. |
| **8. Ionosphere layer :** | It is a layer that contains charged ions and it has an important role in wireless communications. |
| **9. Van-Allen belts :** | They are two magnetic belts surrounding ionosphere and play an important role in scattering of harmful charged cosmic radiations. |
| **10. Aurora phenomenon :** | It is a phenomenon that appears as brightly coloured light curtains seen at the both poles (The North and South Poles) of the Earth. |
| **11. Exosphere :** | It is a region in which the atmospheric envelope is inserted in outer space. |
| **12. Ozone hole :** | It means thinning or losing parts of ozone layer above the South pole. |
| **13. Ozone molecule :** | - It is a molecule formed by combining the atom of an element (which is oxygen) with a molecule of the same element.<br>- It is a gas, whose molecule consists of three oxygen atoms. |
| **14. Dobson :** | It is the measuring unit of the degree of ozone layer. |
| **15. Near ultraviolet rays (UVA) :** | It is a type of ultraviolet rays that penetrate ozone layer by a ratio 100%. |
| **16. Medium ultraviolet rays (UVB) :** | It is a type of ultraviolet rays that is absorbed by a ratio 95% by ozone layer. |
| **17. Far ultraviolet rays (UVC) :** | It is a type of ultraviolet rays that is absorbed completely (100%) by the ozone layer. |



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|---|---|
| **18. Global Warming phenomenon :** | It is the continuous increase in the average temperature of the Earth's near-surface air. |
| **19. Greenhouse effect :** | It is the trapping of infrared radiation in the troposphere layer due to the increase of the ratio of greenhouse gases which causes the increase of planet Earth temperature. |

## 2 Important shortcuts :

| | |
|---|---|
| **1. UV** | Ultraviolet rays. |
| **2. STP** | Standard temperature and pressure. |
| **3. $CFC_s$** | Chlorofluorocarbon compounds. |
| **4. IPCC** | The intergovernmental Panel on Climate Change. |

## 3 Important laws and solved problems :

**1 The temperature changes which occur in troposphere layer.**

- The temperature decreases with a rate (6.5°C) for each (1 km) height above sea level.
- The amount of change (decrease or increase) in temperature = height (km) × 6.5
- The temperature at the base of a mountain
  = the temperature at its top + the increase in temperature.
- The temperature at the top of a mountain
  = the temperature at its base – the decrease in temperature.

**Problems :**

**Problem 1** ***Calculate the temperature at the base of a mountain, if its height is 6000 m. and the temperature at its top is 10°C.***

***Solution***

- Height $= \frac{6000}{1000} = 6$ km.
- The increase in temperature = height × 6.5°C
  $= 6 \times 6.5 = 39°C$
- The temperature at the base of a mountain
  = the temperature at its top + the increase in temperature
  $= 10 + 39 = 49°C$



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**Problem 2** ***Calculate the height of a mountain if the temperature at its base is 30°C and at its top is (– 6°C).***

**Solution**

- The temp. at the top of a mountain = the temp. at its base – the decrease in temp.

$-6 = 30 -$ the decrease in temp.

The decrease in temp. $= 30 + 6 = 36°C$ $\therefore 36 =$ Height (km) $\times 6.5$

$$\text{height} = \frac{36}{6.5} = 5.5 \text{ km.}$$

### 2 The ratio of erosion of ozone layer in a certain area

∵ The degree of erosion of ozone layer in a certain area = the normal degree of ozone layer – the degree of ozone in this area.

∴ The ratio of erosion of ozone layer in a certian area

$$= \frac{\text{Degree of erosion of ozone layer}}{\text{Normal degree of ozone layer}} \times 100\ \%$$

**Problem** ***Calculate ratio of erosion of ozone layer in an area if you know that the degree of its ozone is 150 dobson.***

**Solution**

The degree of erosion of ozone layer in an area $= 300 - 150 = 150$ dobson

The ratio of erosion of ozone layer in this area $= \frac{150}{300} \times 100 = 50\%$

## 4 Important numbers and ratios :

| | |
|---|---|
| 1. The height of atmospheric envelope : | **1000 km.** |
| 2. The normal atmospheric pressure : | **1013.25 mb.** |
| 3. The percentage of the mass of atmospheric air that is present in the area between sea level and 3 km height : | **50%** |
| 4. The percentage of the mass of atmospheric air that is present up to 16 km height above sea level : | **90%** |
| 5. The thickness of troposphere layer : | **13 km.** |



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|---|---|
| 6. The percentage of the mass of atmospheric air in troposphere : | **75%** |
| 7. The percentage of atmospheric water vapour in troposphere : | **99%** |
| 8. The atmospheric pressure at the end of troposphere (tropopause) : | **100 mb** |
| 9. The temperature at the end of troposphere (tropopause) : | **– 60°C** |
| 10. The thickness of stratosphere layer : | **37 km.** |
| 11. The atmospheric pressure at the end of stratosphere (stratopause) : | **1 mb** |
| 12. The temperature at the end of stratosphere (stratopause) : | **0°C** |
| 13. The thickness of mesosphere : | **35 km.** |
| 14. The atmospheric pressure at the end of mesosphere (mesopause) : | **0.01 mb** |
| 15. The temperature at the end of mesosphere (mesopause) : | **– 90°C** |
| 16. The thickness of thermosphere : | **590 km.** |
| 17. The temperature at the end of thermosphere : | **1200°C** |
| 18. The thickness of ozone layer : | **20 km.** |
| 19. The height in which the presence of charged ions ends in ionosphere : | **700 km.** |
| 20. Number of oxygen atoms in ozone molecule : | **3** |
| 21. The thickness of ozone layer under (STP) conditions : | **3 mm.** |
| 22. Natural degree of ozone layer : | **300 Dobson unit** |
| 23. The wavelength of near ultraviolet rays (UVA) : | **315 – 400 nm.** |
| 24. The wavelength of medium ultraviolet rays (UVB) : | **280 – 315 nm.** |
| 25. The wavelength of far ultraviolet rays (UVC) : | **100 – 280 nm.** |
| 26. The ratio of near UV radiations that penetrate ozone layer : | **100%** |
| 27. The ratio of medium UV radiations that don't penetrate ozone layer (Or the ratio of medium UV radiations that are absorbed by ozone layer) : | **95%** |
| 28. The ratio of far UV radiations that don't penetrate ozone layer (Or the ratio of far UV radiations that are absorbed by ozone layer) : | **100%** |
| 29. Nanometer : | **$1 \times 10^{-9}$ m.** |



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## 5 Importance or uses :

| Item | Importance or uses |
|---|---|
| **1. Barometer :** | It is used to measure the atmospheric pressure. |
| **2. Altimeter :** | It is used by pilots in aeroplanes to measure the elevation from sea level based on atmospheric pressure. |
| **3. Aneroid :** | It is used to determine the possible day weather based on atmospheric pressure. |
| **4. Atmospheric pressure maps :** | They are used to determine the different atmospheric pressure areas and consequently the direction of wind movement. |
| **5. Isobar lines :** | They are used to determine the equal atmospheric pressure areas. |
| **6. Troposphere :** | - In which, all atmospheric phenomena take place.<br>- It organizes the Earth's temperature. |
| **7. Ozone layer :** | It acts as a protective shield for living organisms against the harmful chemical effects of ultraviolet radiations. |
| **8. Mesosphere :** | It protects the planet Earth from celestial rocky masses that enter the atmospheric envelope by formation of meteors. |
| **9. Ionosphere :** | It is important in wireless communications and broadcasting. |
| **10. Van-Allen belts :** | They play an important role in scattering harmful charged cosmic radiations away from the Earth. |
| **11. Exosphere :** | In which, satellites orbit around the Earth. |
| **12. Satellites :** | They transmit weather conditions information and TV programs. |
| **13. Chlorofluorocarbon ($CFC_s$) compounds (Freons) :** | They are used as :<br>• A cooling substance in air conditioning sets.<br>• A propellant substance in aerosols.<br>• A flating substance in making foam backing.<br>• A solvent substance for cleaning electric circuits slides. |
| **14. Methyl bromide gas :** | It is used as an insecticide to preserve stored agricultural crops. |
| **15. Halons :** | They are used in extinguishing fires. |



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## 6 What is the role of ... ?

| | |
|---|---|
| **1. Ultraviolet radiation in the formation of ozone layer :** | Oxygen gas molecule absorbs ultraviolet radiation (UV) which causes the break down of its double covalent bond giving two free oxygen atoms. $O_2 \xrightarrow{UV} O + O$ |
| **2. $CO_2$ in global warming :** | Increase of $CO_2$ in air causes the increase in the temperature of Earth planet. |
| **3. Infrared radiation in global warming :** | Infrared radiation has thermal effect, so when trapped in the troposphere layer that leads to increasing the Earth planet temperature. |

## 7 Give reasons for :

**1. The atmospheric pressure decreases by increasing the altitude above sea level.**

Due to decreasing the length of air column.

**2. Altimeter instrument is important for navigation.**

Because it is used by pilots in aeroplanes to determine their elevations from sea level based on the atmospheric pressure.

**3. Winds blowing.**

Because wind moves from regions of high atmospheric pressure to that of low atmospheric pressure.

**4. Wind moves from an area to another on the surface of the Earth.**

Due to the difference in atmospheric pressure from an area to another where, there are areas of high atmospheric pressure and another areas of low atmospheric pressure.

**5. The troposphere layer is called by this name.**

Because all atmospheric turbulences take place in it.

**6. The temperature at the top of a mountain is less than that at its foot.**

Because in troposphere layer, the temperature decreases with a rate (6.5°C) for each 1km height.

**7. All weather conditions take place in troposphere layer.**

Because it contains about 75% of the mass of atmospheric envelope.



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**8. Troposphere layer regulates the Earth's temperature.**

Because it contains 99% of atmospheric water vapour.

**9. The air motion in troposphere layer is vertical.**

Because hot air currents (less density) move upwards, while cold air currents (high density) move downwards.

**10. Hot air currents move upwards, while cold air currents move downwards.**

Because the density of hot air is less than the density of cold air.

**11. The stratosphere layer is called by ozonic atmospheric envelope.**

Due to the presence of ozone layer in it.

**12. The temperature is high in the upper part of stratosphere layer.**

This is due to the absorption of ultraviolet rays (emitted from the Sun) by ozone layer, which is present at its upper part.

**13. Stratosphere layer is important for man's life.**

Because it contains ozone layer which absorbs harmful ultraviolet radiations emitted from the Sun and also it is convenient for flying of planes.

**14. • The lower part of stratosphere is suitable for flying of aeroplanes.**

**• Pilots prefer to fly their planes in stratosphere.**

Because in this part, the air motion is horizontally and neither clouds nor weather disturbances exist.

**15. The third layer of atmospheric envelope is named by mesosphere.**

Because it is the middle layer.

**16. Mesosphere is the coldest layer.**

Because the temperature in such layer decreases with a high rate as we go up.

**17. Mesosphere layer is highly rarefied.**

Because it contains limited quantities of helium and hydrogen gases only.

**18. Luminous meteors are formed in mesosphere layer.**

Due to burning of celestial rocky masses in this layer as a result of their friction with air molecules.

**19. The last layer of atmospheric envelope is called thermal layer.**

Because it is the hottest layer in atmospheric envelope.

**20. The upper part of thermosphere layer is called ionosphere.**

Because it contains charged ions.



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**21. Ionosphere is important for radio stations.**

Because it reflects radio waves transmitted by radio stations and communication centres.

**22. The harmful charged cosmic radiations are scattered away from the Earth before entering ionosphere layer.**

Due to the presence of Van-Allen belts.

**23. Occurrence of aurora phenomenon.**

Due to scattering of harmful charged cosmic radiations away from the Earth.

**24. Formation of ozone layer in the stratosphere layer.**

Because it is the first layer of atmospheric envelope which contains suitable amount of oxygen gas faces ultraviolet radiations emitted from the Sun.

**25. Ozone layer is important.**

Because it acts as a protective shield for living organisms against the harmful chemical effect of ultraviolet radiation.

**26. Ozone layer acts as a protective shield for living organisms.**

Because it absorbs harmful ultraviolet radiation emitted from the Sun.

**27. The continuity of ozone layer erosion.**

Due to increasing the pollutants.

**28. Increasing the size of ozone hole in September every year.**

Because all pollutants assemble as black clouds that are pushed by wind towards south pole making erosion of ozone layer increases from year to year.

**29. Chlorofluorocarbon compounds are dangerous to the environment.**

Because they cause erosion of ozone so, harmful ultraviolet radiations penetrate the Earth.

**30. Factories should stop their production of foam boxes.**

To reduce the use of chlorofluorocarbon compounds as they are used in making foam backing.

**31. Scientists ban using freon as a cooling material.**

Because freon causes erosion of ozone layer.

**32. Stop manufacturing of concorde aeroplanes.**

Because their exhausts contain nitrogen oxides that affect the ozone layer.

**33. Increasing the average temperature of the Earth's near-surface air during the last years.**

Due to increasing of greenhouse gases in the atmosphere.



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**34. Increasing of $CO_2$ gas ratio in the atmosphere.**

Due to fossil fuel burning, cutting trees and forests fires.

**35. Infrared radiation cannot penetrate the Earth's atmosphere.**

Because it has long wavelength.

**36. The trading or producing $CFC_s$ compounds is prohibited.**

To protect ozone layer.

**37. Naming global warming phenomenon by greenhouse effect.**

Because the Earth's atmosphere resembles the role of glass in greenhouse as it prevents penetration of infrared radiation causing increasing of Earth's temperature.

**38. Global warming phenomenon seriously affects the life on poles.**

Because it causes melting of ice and snow of both South and North Poles which would increase sea level in seas and oceans.

**39. Most countries are attempting to reduce the use of fossil fuel.**

To prevent increasing the ratio of greenhouse gases which increase the temperature of Earth planet.

## 8 What happens when ... ?

**1. Diving into depths of the sea [concerning the pressure].**

The pressure under water increases by increasing the depth from sea level.

**2. Ascending upwards in troposphere (concerning the temperature and the atmospheric pressure).**

The temperature decreases with a rate 6.5°C for each 1 km. and the atmospheric pressure decreases.

**3. Descending downwards in stratosphere [concerning the temperature and atmospheric pressure].**

The atmospheric pressure increases and temperature decreases.

**4. There is no ionosphere layer at the end of thermosphere layer.**

Radio waves transmission does not occur as this layer reflects radio waves transmitted by communications centres.



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**5. Celestial bodies move with a very high velocity in mesosphere layer.**

Luminous meteors are formed as a result of their friction with air molecules.

**6. Ultraviolet radiation hits oxygen molecule.**

The bond between its molecule is broken down giving two free oxygen atoms (2O)

$$O_2 \xrightarrow{UV} O + O$$

**7. Oxygen atom combines with oxygen molecule.**

Ozone molecule is formed.

$$O + O_2 \longrightarrow O_3$$

**8. Existance of ozone in conditions of standard temperature and pressure (STP).**

The thickness of ozone layer is 3 mm only.

**9. Overuse of methyl bromide as an insecticide.**

Erosion of ozone layer increases.

**10. Overuse of freon.**

Erosion of ozone layer increases.

**11. Increasing the ratio of nitrogen oxides in the atmospheric envelope.**

Erosion of ozone layer increases.

**12. The ozone layer is broken down over an area.**

Medium and far UV rays penetrate ozone layer and cause harmful effects.

**13. Increasing the ratio of greenhouse gases in the atmosphere.**

Increasing the temperature of Earth planet.

**14. Infrared radiations don't reemit back from troposphere layer.**

The increase of planet Earth's temperature due to the thermal effect of infrared radiations.

**15. The melting rate of polar ice is increased (concerning the coastal regions).**

Coastal areas could drown.

**16. Earth's temperature increases (concerning the climatic changes).**

Tropical hurricanes, destroying floods, drought waves and forests fires take place.

**17. The continuous increase in consumption of fossil fuel.**

The ratio of $CO_2$ gas increases in the atmospheric air by a continuous way which leads to an increase in the planet Earth temperature.



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## 9 Comparisons :

### 1 Layers of atmospheric envelope :

| Points of comparison | Troposphere layer | Stratosphere layer | Mesosphere layer | Thermosphere layer |
|---|---|---|---|---|
| • Thickness : | 13 km. | 37 km. | 35 km. | 590 km. |
| • Temperature : | – 60°C at its end. | 0°C at its end. | – 90°C at its end. | 1200°C at its end. |
| • Atmospheric pressure : | 100 mb at its top. | 1 mb at its top. | 0.01 mb at its top. | |
| • It contains : | - 75% of the mass of the atmospheric air.<br>- 99% of atmospheric water vapour. | Most of ozone gas which is found in atmospheric envelope. | Limited quantities of helium and hydrogen gases only. | Charged ions in its upper part. |
| • Air movement : | Vertically. | Horizontally. | | |

### 2 Ionosphere layer and ozone layer :

| Points of comparison | Ionosphere layer | Ozone layer |
|---|---|---|
| • Importance : | It reflects radio waves transmitted by radio stations. | It reflects ultraviolet rays emitted from the Sun. |
| • Place : | In the upper part of thermosphere layer. | In the lower part of stratosphere layer. |

### 3 Near ultraviolet rays and far ultraviolet rays :

| Points of comparison | Near ultraviolet rays | Far ultraviolet rays |
|---|---|---|
| • The ratio of its penetration into the Earth's surface : | 100 % | 0 % |
| • Wavelength : | 315 – 400 nm. | 100 – 280 nm. |
| • Their effects on living organisms : | Useful | Harmful |



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## 4 Greenhouse effect and ozone hole :

| Points of comparison | Greenhouse effect | Ozone hole |
|---|---|---|
| • **Causes :** | Increasing the ratio of greenhouse gases in the atmosphere. | • $CFC_s$ compounds.<br>• Methyl bromide gas.<br>• Halons.<br>• Nitrogen oxides. |
| • **Harms :** | Increasing the Earth's temperature causing global warming. | Penetration of harmful ultraviolet rays to Earth's surface which threaten the life of living organisms. |

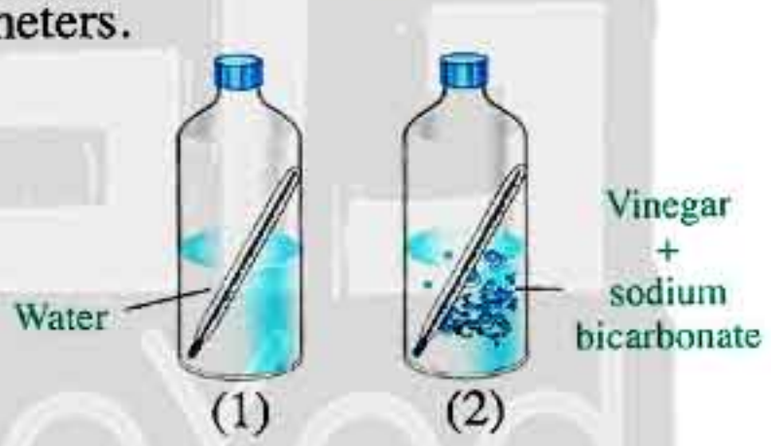
## 10 Activity :

**ACTIVITY** To know the global warming phenomenon.

### Tools :

- 2 empty soda bottles.
- Sodium bicarbonate powder.
- Vinegar.
- 2 thermometers.
- Water.

*Notice :* $CO_2$ gas is produced from the reaction between sodium bicarbonate and vinegar.




### Steps :

1. Pour some water in bottle (1) and the same amount of vinegar in bottle (2).
2. Insert a thermometer in each bottle.
3. Close bottle (1) and put some sodium bicarbonate powder in bottle (2) and close it immediately to keep $CO_2$ gas trapped.
4. Put both bottles in sunny place.

### Observation :

Higher reading of the thermometer in bottle (2).

### Conclusion :

The increase in the concentration of $CO_2$ gas leads to the increase in the temperature.

**** Similarly :***

- The temperature of planet Earth has been increasing since 1935 due to increasing the greenhouse gases [especially $CO_2$].



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## 11 Important drawings :

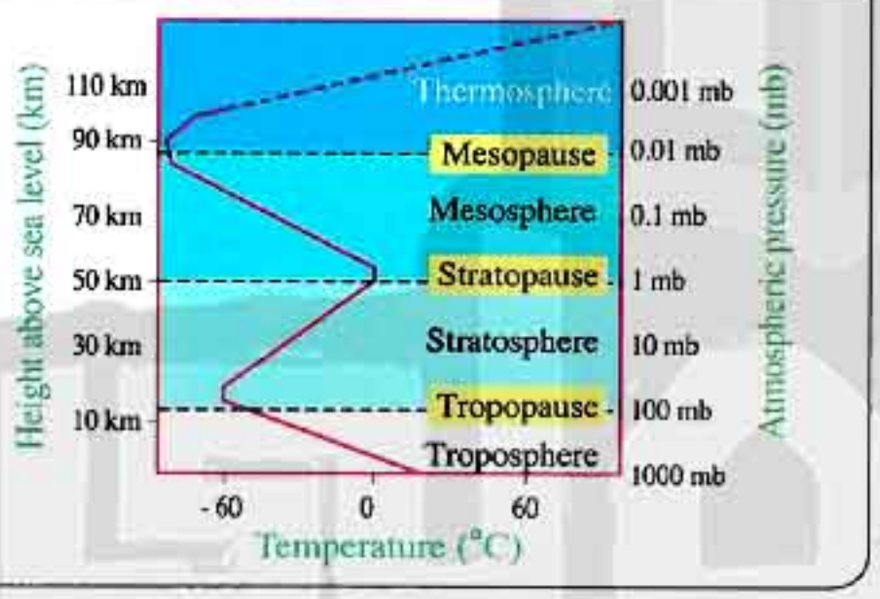
### 1 Aneroid instrument




### 2 Altimeter instrument



### 3 Layers of atmosphere




### 4 Van-Allen belts



Van-Allen belts

### 5 The thickness of ozone layer at S.T.P.



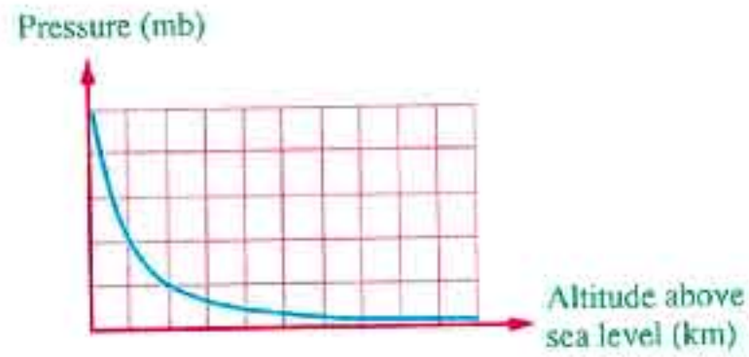

The thickness of ozone layer
at S.T.P.



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**6 The atmospheric pressure changes by changing the height above sea level :**

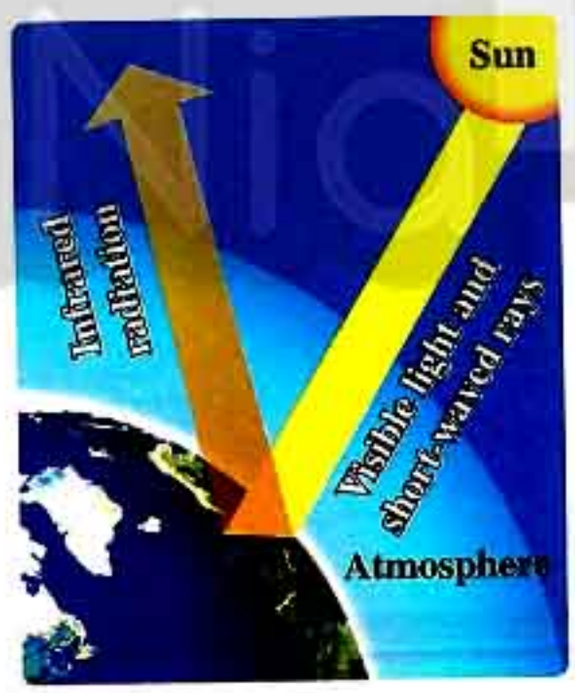



The relation between the altitude above sea level and the pressure

**7 Greenhouse effect :**



**8 Global warming phenomenon :**









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## 12 Main points :

### Lesson 1 The Atmospheric Layers :

1. The atmospheric pressure is measured in a unit called **a bar** or **millibar**.

   1 bar (b) = 1000 millibar (mb).

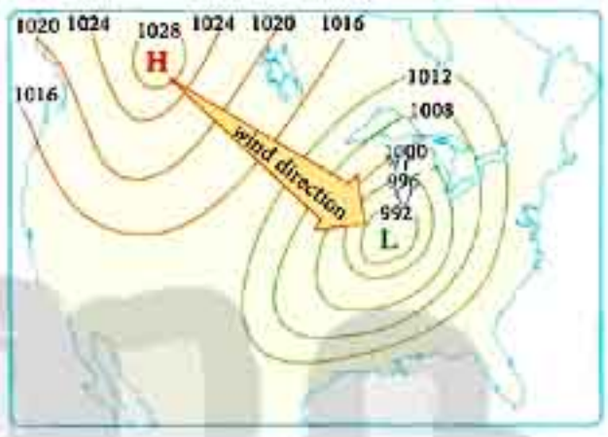
2. The normal atmospheric pressure = 1013.25 mb.

3. The atmospheric pressure increases by increasing the length of air column and vice versa.

4. The density of air decreases by increasing the elevation above sea level.

5. In atmospheric maps :

   - The areas of low atmospheric pressure are represented by "L".
   - The areas of high atmospheric pressure are represented by "H".




6. The wind moves from the areas of high atmospheric pressure to the areas of low atmospheric pressure.

7. The atmospheric envelope consists of four layers above sea level which are classified according to :

   - **The change in atmospheric pressure.**
   - **The change in temperature.**

### Lesson 2 Erosion of Ozone Layer and Global Warming :

#### 1. Formation of ozone gas :

1. Oxygen gas molecule ($O_2$) absorbs ultraviolet radiation (UV), which causes the break down of the bond between the two oxygen atoms giving two free oxygen atoms (2O). $O_2 \xrightarrow{UV} O + O$

2. Each oxygen atom combines with an oxygen molecule forming ozone molecule ($O_3$) which is composed of three oxygen atoms.

$$O + O_2 \longrightarrow O_3$$



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**2. Pollutants of ozone layer :**

1. Chlorofluorocarbon compounds.
2. Methyl bromide gas.
3. Halons.
4. Nitrogen oxides.

**3. The most important greenhouse gases :**

1. Carbon dioxide gas ($CO_2$).
2. Chlorofluorocarbon compounds ($CFC_s$).
3. Methane gas ($CH_4$).
4. Nitrous oxide ($N_2O$).
5. Water vapour ($H_2O$).

**4. Interpretation of the greenhouse phenomenon :**

When the concentration of greenhouse gases increases in the atmosphere , the atmosphere plays the role of glass in the greenhouse as :

1. It permits the visible light and short-waved rays produced from the Sun to pass.
2. The Earth and its components absorb these rays and reemit the radiation back in the form of infrared radiation.
3. The infrared radiation cannot penetrate the atmosphere, because it has a long wavelength. So , it is kept trapped in the troposphere causing the rise of planet Earth temperature (Greenhouse phenomenon).

**5. The negative effects of global warming phenomenon :**

***(1) Melting of the ice and snow of both South and North Poles :***

Melting of polar ice would increase the level of seas and oceans which threats :

1. Coastal areas as they could drown.
2. Extinction of some polar animals like polar bear and seals.

***(2) Severe climatic changes :***

Among these features is the repeated occurrence of :

1. Tropical hurricanes such as hurricane Katrina in 2005.
2. Destructive floods.
3. Drought waves.
4. Forests fires.



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# Final Revision on Unit 3

## 1 Definitions (or scientific terms) :

| | |
|---|---|
| **1. Fossils :** | They are traces and remains of old living organisms that are preserved in sedimentary rocks. |
| **2. Trace :** | Traces indicate the activity of an old living organism during its life. |
| **3. Remains :** | Traces indicate the remains of an old living organism after death. |
| **4. Fossil of a complete body :** | It is a type of fossils which was formed as a result of the rapid burying of the organism as soon as it died in a medium preserves it from decomposition and it keeps the whole shape and all the details of the body. |
| **5. Amber :** | It is the solidified resinous matter which was secreted by pine trees in old geologic ages. |
| **6. Solid mold fossil :** | It is the replica of the internal details of the structure of an old living organism left after its death in sedimentary rocks. |
| **7. Cast fossil :** | It is the replica of the external details of the structure of an old living organism left after its death in sedimentary rocks. |
| **8. Petrified fossils :** | They are fossils in which minerals replace the organic matter for organisms part by part leaving the shape without any change. |
| **9. Petrified woods :** | They are fossils which are formed as a result of replacing the organic matter of wood by the silica part by part and they give us details about the life of an old plant. |
| **10. Petrification :** | • It is the process of changing parts of old living organisms (plants or animals) into rocky materials.<br>• It is the process of replacing the wood material of trees by silica to form petrified woods part by part. |
| **11. Index fossils :** | They are fossils of organisms that had lived for a short period of time in the past and had a wide geographic distribution, then become extinct. |
| **12. Fossil record :** | The fossils that exist in the rocks of different areas that indicate the extinction and evolution of organisms. |
| **13. Extinction :** | • It is the continuous decrease without compensation in the number of a certain species of living organisms until all members of species die out.<br>• It is dying out of all members of species of living organisms. |
| **14. Food chain :** | It is a path of energy that transmits from a living organism to another. |



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| | |
|---|---|
| **15. Food web :** | A group of food chains connected to each other. |
| **16. Simple ecosystem :** | It is an ecosystem that has a few members and it is severely affected by the absence of one of its species. |
| **17. Complicated ecosystem :** | It is an ecosystem that has multiple members and it is not affected much by the absence of one of its species. |
| **18. Natural protectorates :** | They are safe areas established to protect endangered species in their homeland. |

## 2 Importance (or the role of) :

| Item | Importance (or the role of) |
|---|---|
| **1. Fossils :** | • Age determination of sedimentary rocks.<br>• Figuring out the paleoenvironment.<br>• Studying life evolution.<br>• Petroleum exploration. |
| **2. Index fossils :** | They indicate the age of sedimentary rocks existed in them. |
| **3. Nummulites fossils :** | They indicate that El-Mokattam's mountain was a sea floor more than 35 million years ago. |
| **4. Coral fossils :** | They indicate that the environment where they lived was clear warm shallow seas. |
| **5. Ferns fossils :** | They indicate that the environment where they lived was a hot and rainy tropical environment. |
| **6. Fossil record :** | It indicates the extinction and evolution of organisms. |
| **7. Microfossils (foraminifera and radiolaria) :** | They indicate that :<br>• The age of rocks existed in them.<br>• The suitable conditions for petroleum formation. |
| **8. Natural protectorate :** | It protects endangered species in their homeland. |
| **9. Papyrus plant :** | Pharaohs used it to manufacture writing papers. |
| **10. Bluestone protectorate :** | It protects grey bear from extinction. |
| **11. Ras Mohamed protectorate :** | It protects rare species of coral reefs and coloured fish from extinction. |
| **12. Wadi Hetan in wadi El-Raiyan protectorate :** | It contains complete whales' fossils 40 million years ago. |



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## 3 Important tables :

### 1 Extinct species in the old times :

**1 Dinosaur :**



Dinosaur became extinct from 66 million years ago.

**2 Mammoth :**



Mammoth is called the grand father of recent elephant, the first mammoth fossil was discovered in Siberia snow in year 1798.

### 2 Extinct species in the recent times :

**1 Dodo bird :**



It is a non flying bird due to the reduced size of its wings.

**2 Quagga :**



- It is a mammal animal.
- It is considered the midway between horse and Zebra.

### 3 Endangered species :

**1 Panda bear :**



**2 Rhinoceros :**





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**3 Ibis bird :**



**4 Barbary sheep :**



**5 Papyrus plant :**



Used by pharaohs to manufacture writing paper.

**6 Bald eagle :**



It is called bald because its head is covered with white feathers.

## 4 The important world's protectorates :

| Protectorate | Location | Protected kinds |
|---|---|---|
| **1. Bluestone protectorate :** | USA | Grey bear  |
| **2. Panda protectorate :** | Northeastern China. | Panda bear  |



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## 5 The important Egypt's protectorates :

| Protectorate | Location | Protected kinds |
|---|---|---|
| **1. Ras Mohamed protectorate :** The first established protectorate in Egypt in 1983. | South Sinai governorate. | Rare species of coral reefs and coloured fish  |
| **2. Wadi El-Raiyan protectorate (Wadi Hetan area) :** | El-Fayoum governorate. | Complete whales' skeletons fossils (40 million years ago).  |

## 4 Give reasons for :

1. **Mammoth fossil is preserved as a complete body fossil.**
   Because when it died, it was rapidly buried in snow, so its body didn't decompose.
2. **Amber is considered as a suitable medium for formation of complete body fossils.**
   Because it is formed of solidified resinous matter which preserves small organisms (like insects) inside it from decomposition.
3. **Ammonites fossil is classified as a mold fossil.**
   Due to formation of a replica of the internal details of a shell of ammonites.
4. **Formation of petrified woods fossils.**
   Due to replacing the organic matter of wood by silica part by part.
5. **Naming the petrified forest with wood mountain.**
   Because it contains petrified wood which looks like rock.
6. **The petrified woods are considered as fossils although they look like rocks.**
   Because they give us the details about the life of an old plant.
7. **El-Mokattam's mountain was a part of a sea floor more than 35 million years ago.**
   Due to the presence of nummulites fossils in the limestone rocks of El-Mokattam's mountain.



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**8. Nummulites fossils are considered as index fossils.**

Because they indicate the age of sedimentary rocks, due to the age of rocks is the same age of fossils existed in them.

**9. Not all known fossils are considered as index fossils.**

Because the index fossils are the fossils of living organisms that lived a short period of time in the past and wide geographic distribution, then became extinct and these conditions are not available in all fossils.

**10. • Importance of fossils in petroleum exploration.**

**• Foraminifera and radiolaria have an important role in petroleum exploration.**

Because the presence of them in the rocks of the exploratory wells indicate that the suitable conditions for petroleum exploration.

**11. Occurrence of old extinctions [macro extinctions].**

Due to : - Meteorite impacts with the Earth.
- The violent Earth movement.
- The onset of a long glacial age.
- Emission of poisonous gases from active volcanoes.

**12. Occurrence of recent extinction.**

Due to : - Destroying natural habitat.
- Environmental pollution.
- Overhunting.
- Climatic changes and natural disasters.

**13. Dodo bird was an easy target for hunters.**

Due to the reduced size of its wings, so it is a non-flying bird.

**14. Naming the bald eagle by this name.**

Because the head of it is covered with white feathers which makes it look like bald.

**15. • The desert ecosystem is significantly affected by the absence of one of its species.**

**• The simple ecosystem is significantly affected by the absence of one of its species.**

Due to the absence of alternative that compensates the absence of this species.

**16. Scientists attempt to establish a gene bank for some types of living organisms.**

To protect the rare and endangered living organisms.

**17. Some governments are interested in establishing natural protectorate areas.**

To protect endangered living organisms in their homeland.

**18. Bluestone is an important natural protectorate.**

Because it protects grey bear from the danger of extinction.

**19. World organizations are intersted in studying the environment of Ras Mohamed protectorate.**

Because it contains rare species of coral reefs and coloured fish.



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**20. Wadi Hetan (a part of Wadi El-Raiyan protectorate in El-Fayoum) is considered the most important area in this protectorate.**

Because it contains complete whales' fossils 40 million years ago.

## 5 What are the consequences of each of the following ... ?

**1. An organism is buried fast after death in snow.**

A complete body fossil of it is formed.

**2. Dipping old insects in amber.**

The bodies of insects are preserved inside it from decomposition.

**3. The solidification of the mineral sediments inside the ammonites and decomposition of its shell over millions of years.**

A solid mold fossil for ammonites is formed.

**4. Putting a clam's shell on the surface of a Flat piece of clay and pressing it gently.**

A cast of shell is formed carrying the external details of its shell.

**5. Silica matter replaces wood material part by part of an old trees.**

They change into petrified wood.

**6. Using chemical insecticides in a balanced ecosystem.**

The food chains break down.

**7. Extinction of species from a balanced ecosystem.**

It causes a cavity in the path of energy in the ecosystem that would disturb the ecosystem equilibrium or destroy it.

**8. The absence of one type of species from the simple ecosystem.**

It is severely affected due to the rarity of alternative that compensates this absence.

## 6 Comparisons :

### 1 Mammoth fossil and amber fossil :

| Mammoth fossil | Amber fossil |
|---|---|
| Burying of mammoth after death immediately in snow which keeps it from decomposition. | Immersing insects in resinous matter (which was secreted by pine trees) which solidifies and preserves the bodies of these insects inside it from decomposition. |



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## 2 Trace and remains :

| Trace | Remains |
|---|---|
| Traces indicate the activity of an old living organism during its life.<br>***Ex. :*** Traces of worm's tunnels. | Traces indicate the remains of an old living organsim after death.<br>***Ex. :*** Remains of dinosaur's skull. |

## 3 Mold and cast :

| Mold | Cast |
|---|---|
| It is the replica of the internal details of the structure of an old living organism.<br>***Ex. :*** Trilobite fossil. | It is the replica of the external details of the structure of an old living organism.<br>***Ex. :*** Fish fossil. |

## 4 Mold and trace :

| Mold | Trace |
|---|---|
| - Traces for the internal details of the structure of an old living organism leaving them in the sedimentary rocks after death.<br>***Ex. :*** Nummulites fossil. | - Traces that indicate an activity of an old living organism leaving them in sedimentary rocks during its life.<br>***Ex. :*** Dinosaur's foot print. |

## 5 Cast and trace :

| Cast | Trace |
|---|---|
| - Traces for the external details of the structure of an old living organism leaving them in sedimentary rocks after death.<br>***Ex. :*** Ferns fossil. | - Traces that indicate an activity of an old living organism leaving them in sedimentary rocks during its life.<br>***Ex. :*** Worms' tunnels. |

## 6 Coral fossils and ferns fossils :

| Coral fossils | Ferns fossils |
|---|---|
| The environment where coral lived was clear warm shallow seas. | The environment where ferns lived was hot and rainy tropical. |



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### 7 Nummulites fossil and foraminifera fossil :

| Nummulites fossil | Foraminifera fossil |
|---|---|
| It indicates that the area of El-Mokattam's mountain was a sea floor more than 35 million years ago. | It indicates that :<br>- The age of rocks existed in the exploratory wells.<br>- The conditions are suitable for petroleum formation. |

### 8 Simple and complicated ecosystems :

| Simple ecosystem | Complicated ecosystem |
|---|---|
| - It is characterized by containing a few number of members of living organisms. **(Few members)**<br>- It is severely affected by the absence of one of its species, because of the rarity of alternative that compensates this absence.<br>***Ex. :*** Desert. | - It is characterized by containing a large number of members of living organisms. **(Multiple members)**<br>- It is not affected much by the absence of one of its species, because it has many alternatives.<br>***Ex. :*** Tropical forest. |

## 7 Important figures :

**Examples of traces :**

Worm's tunnels



Dinosaur's foot print



**Examples of remains :**

Remains of a dinosaur's skull



Remains of shark's teeth





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**Examples of solid mold fossils :**

Ammonites fossil



Nummulites fossil



Trilobite fossil

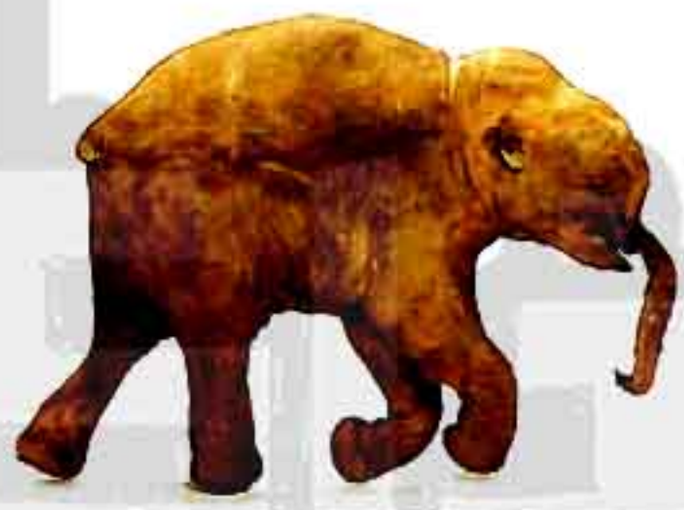


**Examples of complete body fossils :**

Amber fossil



Mammoth fossil



**Examples of cast fossils :**

Fish fossil



Ferns fossil



**Examples of petrified fossils :**

Dinosaur's tooth



Dinosaur's eggs



Petrified wood





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| Intermediate fossil : | Microfossils | |
|---|---|---|
| Archaeopteryx fossil | Radiolaria | Foraminifera |
|  |  |  |

## 8 Main points :

### Lesson 1 Fossils :

**1. How the ammonites solid mold fossil is formed ?**

- When a snail (or clam) dies, it falls on the sea floor, where its soft parts decomposed leaving the shell which is buried in sediments.
- The sediments fill up the shell cavities and solidify as the time passes.
- The shell decomposes completely, leaving a solid rock mold carrying the internal details of the snail.

**2. Suitable conditions for fossils formation (or preservation) :**

1. Presence of hard skeleton of organism.
2. The organism body must be buried immediately after death in a medium that preserves it from decomposition.
3. The existence of a suitable medium in which the mineral material replaces the organic material of the living organism.

**3. Studying the fossil record showed that :**

1. Life started first in sea, then established on land.
2. Organisms developed from simple to complicated as :
   - Algae appeared before mosses and ferns.
   - Gymnosperms appeared before angiosperms.
   - Invertebrates (such as corals and mollusks with shells) appeared before vertebrates.
   - Fish were the first vertebrates that appeared, followed by amphibians, then reptiles, and finally birds and mammals appeared together.

**4. Archaeopteryx fossil** is considered a link between reptiles and birds.



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## Lesson 2 Extinction :

### 1. Reasons of extinction :

#### A. Reasons of extinction in old ages [macro extinctions] :

Many Scientists attributed macro extinctions, which many living organisms lived on Earth exposed to like extinction of dinosaurs is due to occurrence of :

1. Meteorite impacts with Earth.
2. The violent Earth movement.
3. The onset of a long glacial age.
4. Emission of poisonous gases from active volcanoes.

#### B. Reasons of extinction in recent ages :

Recent extinction that is occurred now is caused by different factors. Most of them are due to the interference of man with nature such as :

1. Destroying natural habitat.
2. Overhunting.
3. Environmental pollution.
4. Climatic changes and natural disasters.

### 2. Examples of some extinct species in old times :

- Dinosaur.
- Mammoth.

### 3. Examples of some extinct species in the recent times :

- Dodo bird [It is a non-flying bird].
- Quagga [It is considered the midway between horse and zebra].

### 4. Examples of endangered species :

- Panda bear.
- Rhinoceros.
- Bald eagle.
- Ibis bird.
- Papyrus plant.
- Barbary sheep.

### 5. Ways to protect rare and endangered living organisms :

1. Rearing and reproducing the endangered species and sending them back to their native habitats.
2. Establishing gene banks for the much endangered species.
3. Establishing natural protectorate areas.
4. Issuing legislations and rules to organize and control hunting in land, sea , and air especially for the rare types.
5. Increasing the awareness about the importance of natural life to sustain the existence of mankind.



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PART 3

# Final Examinations




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PART 3

## 1 Cairo Governorate — Al Bayan Language School

**Answer the following questions :**

### Question 1

**A Complete the following statements :**

1. The alkali metals are ..... valent.
2. The suitable medium to form a mammoth fossil is .....
3. ..... and ..... are considered from ozone layer pollutants.
4. As we go up 1 km above sea level the temperature ..... with ..... °C.
5. Sodium is kept under the surface of ....., to prevent it from the reaction with .....
6. The elements of group 7 A are called .....
7. The glass permits the passage of ..... rays and visible light.

**B Correct the underlined word :**

1. The strongest non-metal element occurs in the **1st group [1A]**.
2. The ferns fossil indicates that the environment it lived in was **a seafloor**.
3. Each **group** in the modern periodic table ends with inert gas.

### Question 2

**A Choose the correct answer :**

1. The density of pure water in solid state is .....
   a. less than its density in liquid state. b. equal to its density in liquid state.
   c. greater than its density in liquid state. d. greater than its density in vapour state.
2. The hottest atmospheric layer is .....
   a. troposphere. b. stratosphere. c. mesosphere. d. thermosphere.
3. The ozone hole appears over the .....
   a. north pole. b. equator. c. middle east. d. south pole.
4. The air moves ..... in the stratosphere layer.
   a. horizontally b. vertically c. (a) & (b) d. no correct answer
5. The fossils exist in the sedimentary rocks in the Mokattam mountain are .....
   a. ferns. b. coral. c. nummiulite. d. all the pervious.
6. The volume of hydrogen gas evolving from water electrolysis equals ..... the oxygen volume.
   a. that of b. double c. half d. four times

**B Give reasons for :**

1. The occurrence of aurora phenomenon.
2. Sulphur dioxide is considered as acidic oxides.



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3. Water molecule is from polar molecules.
4. Rains, clouds, and winds are in the troposphere.

**C Mention one example for :**

1. Endangered plant.
2. Fossil of complete body.
3. Petrified fossil.
4. From the green house gases.

## Question 3

**A Write the scientific term :**

1. The atmospheric envelope layer that contains a certain limited amount of helium and hydrogen gases only.
2. The environmental system that is not affected severely by the absence of one species of the living organisms that live in it.
3. A bond that exists between water molecules.
4. The continuous decrease in the numbers of individuals from the same species of living organisms without compensation with birthing.
5. The process of conversion of the organic matter of an old living organism into solidified materials, due to replacing the organic matter by minerals.
6. Two magnetic belts help in dispersing the harmful cosmic radiation a way from the Earth.

**B Mention one importance for :**

1. Exosphere region.
2. Altimeter.
3. Silicon.
4. Foraminafera microfossil.

**C Compare between the following :**

1. Atmospheric pressure and atmospheric air. (Defination only)
2. Mesosphere and ionosphere. (Temperature only)

## Question 4

**A Put (✓) or (✗) and correct the wrong ones :**

1. Methyl bromide is used in extinguishing fires. ( )
2. The ozone layer allows the passage of all ultraviolet rays near and medium. ( )
3. The atomic size decreases in periods as the atomic number increases. ( )
4. Lacking of plants on Earth leads to the increase in temperature. ( )
5. The methane gas and nitrous oxide are considered from the green house gases. ( )
6. The Quagga is the most famous extinct kind in the old times. ( )
7. Nonmetal oxides are considered as basic oxides. ( )
8. The index fossil indicated the age of the sedimentary rocks. ( )



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PART 3

**B** What happens in the following situations ... ?

1. Adding the purple sun flower solution to a jar has a piece of burning coal.
2. The passage of electric current through a Hofmann's voltameter containing acidic water.
3. Extinction of a species from a balance ecosystem.
4. Put a lightening magnesium strip inside a test tube contains oxygen.

**C** Write the symbolic chemical equations representing the following reactions :

1. The reaction between chlorine gas and potassium bromide.
2. Dissolving of magnesium oxide in water.

## 2 Cairo Governorate — Al-Waha Language School

Answer the following questions :

### Question 1

Complete the following statements :

1. Moseley located ..... and ..... elements below its table.
2. The atomic size of lithium ($_3$Li) atom is ..... than that of the nitrogen ($_7$N) atom and ..... than that of sodium ($_{11}$Na) atom.
3. The bond between hydrogen atom and oxygen atom in water molecule is ..... bond, while bonds among water molecules are ..... bond.
4. When the temperature of water decreases than 4°C its ..... decreases, while its volume .....
5. Ozone gas is formed in two steps which are :

   a. $O_2 \xrightarrow{UV} O +$ .....  b. $O +$ ..... $\longrightarrow O_3$

6. ..... is the unit used to measure the degree of ozone.
7. Meteors burn in ..... layer of atmosphere.
8. ..... protectorate is the first established natural protectorate in Egypt.
9. During the chemical reaction, metal atom tends to ..... electrons.

### Question 2

**A** Calculate the atomic number of the following elements :

1. An element is located in the 3rd period and group (2 A).
2. An element is located in the 3rd period and group (7 A).



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**B Write the scientific term for each of the following :**

1. The continuous increase of the average temperature of the air near the surface of the Earth.
2. The measuring unit of the atmospheric pressure.
3. Fossils are formed as a result of the rapid burying of organisms in a medium that preserved them from decomposing.
4. The inert gas, which has the same electronic structure of sodium ion ($Na^+$).
5. The bond which is responsible for the abnormal properties of water.
6. The weight of air column of an atmosphere height above a unit area.
7. The atmospheric layer, in which the ozone layer is located.
8. A part from million of million part of metre.
9. One of the atmosphere components that its ratio increase in recent years to reach about 0.038 %.
10. Traces and remains of old living organisms that are preserved in the sedimentary rocks.

**C Calculate the volume of the gas that evolves at the anode if the volume of the gas that evolves at the cathode is 24 $cm^3$.**

## Question 3

**A Give reasons for :**

1. El-Mokattam's mountain was a sea floor more than 35 million years ago.
2. The desert ecosystem is significantly affected by the absence of one of its species.
3. The lower part of stratosphere is suitable for flying aeroplanes.
4. Liquefied nitrogen is used in the preservation of cornea of the eye.

**B Choose from column (B) what suits in column (A) :**

| (A) | (B) |
|---|---|
| 1. Mesopause | a. protects man's life from ultraviolet rays. |
| 2. Tropopause | b. protect man's life from cosmic radiations. |
| 3. Ozone layer | c. is the region between mesosphere and thermosphere. |
| 4. Van-Allen belts | d. is the region between mesosphere and stratosphere. |
| 5. Ionosphere | e. is the region between stratosphere and troposphere. |
| 6. Stratopause | f. is a layer used in wireless communication. |
| | g. its thickness is 13 kilometers. |

## Question 4

**A How can you differentiate chemically between Copper and magnesium [Using HCl] ?**

[Write the chemical equation if it is possible]



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**B** Find the temperature at a point of a height 3 km above sea level if the temperature at sea level is 22°C.

**C** Locate the position of the following elements in the modern periodic table :

[Electronic configuration, group number and period number].

1. Hydrogen ($_{1}H$).
2. Neon ($_{10}Ne$).
3. Calcium ($_{20}Ca$).

**D** Correct the underlined words :

1. As we move down in group (7A) the **metallic property** decreases.
2. **Electronegativity** decreases as we move from left to right in periodic table.
3. The first discovered fossil of mammoth were found preserved in **amber**.
4. Distroying the habitat is one of the factors that contribute to species **adaptation**.

## 3 Cairo Governorate — Manarat AlFarouk Islamic Language School

### Answer the following questions :

### Question 1

**A** Write the scientific term for each of the following :

1. A phenomenon that appears as brightly coloured light curtains seen at both poles of Earth.
2. The disturbed atmospheric layer.
3. Gradual decrease in the number of living organisms without compensation until all die out.
4. Elements, which have more than four electrons in their outermost energy level.
5. The weight of air column of an atmospheric height on a unit area.
6. The process of replacing the wood material of trees by silica to form petrified woods part by part.
7. The descending arrangement of metal elements according to their chemical activity.
8. Safe areas, which are established to protect endangered species in their home land.

**B** Give reasons for :

1. Fossils are important.
2. Ionosphere is important for radio stations.
3. Amber is considered as a suitable medium for formation of complete body fossils.

### Question 2

**A** Write the balanced chemical equations that illustrate the following reactions :

1. Putting a piece of sodium in water.
2. Passing chlorine gas in potassium bromide solution.
3. Formation of ozone gas.



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**B Choose the correct answer :**

1. Luminous meteors are formed in ..... layer.
   a. ionosphere  b. stratosphere
   c. exosphere  d. mesosphere
2. The transitional elements start to appear from period .....
   a. 2  b. 3  c. 4  d. 5
3. An example of microfossils is .....
   a. mammoth.  b. ferns.
   c. radiolaria.  d. archaeopteryx.
4. All of the following are greenhouse gases except .....
   a. $CO_2$  b. $O_2$  c. $N_2O$  d. $CH_4$

**C Mention one difference between each of the following :**

1. Simple ecosystem and complicated ecosystem. (Concerning the effect of extinction).
2. Group "1 A" and group "7 A".

## Question 3

**A Locate the position of the following elements in the modern periodic table with showing your steps :**

1. $^{39}_{19}K$  2. $^{27}_{13}Al$  3. $^{19}_{9}F$

**B Rewrite the following sentences after correcting the underlined words :**

1. Barometer is used to measure the **degree of water pollution**.
2. Ferns fossils indicate that they lived in **mild environment**.
3. When the temperature of water decreases to less than **0°C**, its density decreases and, so it floats on water surface in the form of ice crystals.
4. Most halogens are **trivalent metals**.

**C On electrolysis of a certain volume of acidified water, if the volume of evolved gas above the anode was 2.5 $cm^3$ :**

1. Calculate the volume of the evolved gas above the cathode.
2. What is the name of the gas that evolves above the anode and above the cathode ?
3. Mention the name of the apparatus, which is used in this process.

## Question 4

**A What happens in each of the following cases ... ?**

1. Storing drinking water in plastic bottles.
2. The overuse of methyl bromide as an insectiside.



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**B Mention one importance for each of the following :**

1. Cobalt 60. 2. Stratosphere.

**C Cross the odd word and write the scientific term that represents the others :**

1. Dodo bird / Bald eagle / Mammoth / Quagga.
2. Lithium / Cesium / Sodium / Magnesium.
3. Halons / Nitrogen oxides / Carbon dioxide / Chlorofluorocarbon compounds.

## 4 Cairo Governorate — St. Joseph Maronite Language Schools

**Answer the following questions :**

### Question 1

**A Complete the following statements :**

1. Mendeleev arranged the elements ascendingly according to ....., while Moseley arranged them ascendingly according to .....
2. The highest temperature layer in the atmosphere is ..... and the lowest temperature one is .....
3. Sodium is kept under the surface of ..... to prevent it from the reaction with .....

**B Give reasons for each of the following :**

1. Petrified woods are considered from fossils although they look like rocks.
2. The lower part of the stratosphere is suitable for flying aeroplanes.

**C If the temperature at the foot of a mountain is 40°C. Calculate the temperature at its top if the height of the mountain is 3 km.**

### Question 2

**A Write the scientific term :**

1. The ability of the atom in the covalent molecule to attract the electrons of the chemical bond towards itself.
2. Traces and remains of the old living organisms that are preserved in sedimentary rocks.
3. A phenomenon that appears as brightly coloured light curtains at both the poles of the Earth.
4. Continuous decrease without compensation in the number of a certain species of living organisms until all die out.
5. The measuring unit of the degree of ozone layer.
6. Part of a million of the million part of a metre.



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**B Locate the position of each element in the modern periodic table :**

1. Calcium ($_{20}Ca$).
2. Sulphur ($_{16}S$).

**C Mention one importance for :**

1. Altimeter.
2. Troposphere layer.

## Question 3

**A What happens in the following situations ... ?**

1. Putting a magnesium strip in a test tube containing oxygen.
2. Dissolving magnesium oxide in water.
3. The passage of electric current through Hofmann's voltameter containing acidic water.

**B Compare between :**

1. Mold and cast.
2. Natural and artificial water pollutants.

**C Define :**

1. Van-Allen belts.
2. Greenhouse effect.

## Question 4

**A Put (✓) or (✗) :**

1. Halogens are from monovalent metals. ( )
2. Bohr had discovered the main energy levels. ( )
3. The atomic size decreases in periods as the atomic number increases. ( )
4. Each period starts with a weak metal. ( )
5. Troposphere contains most of atmospheric envelope. ( )
6. The ozone layer locates at altitude from 20 – 40 km above sea level. ( )

**B Mention one example for each of the following :**

1. Extinct bird.
2. Most active metal.
3. Endangered bird.
4. A complete body fossil.

**C Write the symbolic chemical equations that illustrate the following reactions :**

1. Dissolving carbon dioxide in water.
2. Putting a piece of sodium in water.



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## 5 Cairo Governorate — East Nasr City Educational Directorate

**Answer the following questions :**

### Question 1

**A Choose the correct answer :**

1. When sodium reacts with water ..... gas evolves.
   a. $N_2$ b. $O_2$ c. $H_2$
2. Luminous meteors are formed in ..... layer.
   a. ionosphere b. stratosphere c. mesosphere
3. Complete body fossils of insects are found preserved in .....
   a. ammounites. b. amber. c. igneous rocks.
4. The scientist ..... had discovered the main energy levels.
   a. Bohr b. Moseley c. Mendeleev
5. ..... is considered from halogens.
   a. Sodium b. Chlorine c. Helium
6. There are ..... bonds among the water molecules.
   a. metallic b. ionic c. hydrogen
7. Ozone degree is measured in a unit called .....
   a. km. b. dobson. c. $mm^2$.

**B Give reasons for :**

1. Pilots prefer to fly their planes in stratosphere.
2. Elements of the same group have similar properties.
3. Liquefied nitrogen is used in the preservation of cornea of the eye.

**C Mention the importance of each the following :**

1. Hofmann's voltameter.
2. Nummulites fossils.
3. Altimeter.
4. Cobalt 60.

### Question 2

**A Put (✓) sign or (✗) sign in front of the following sentences :**

1. Water and ammonia are from polar compounds. ( )
2. Methyl bromide gas is used as an insecticide. ( )
3. Mendeleev arranged the elements ascendingly according to their atomic number. ( )
4. Ferns fossils indicate that the environment where they lived was a sea floor. ( )
5. Dodo bird and Quagga are from extinct species in the recent time. ( )

**B Problem : Calculate the height of a mountain if the temperature at its base is 30°C at its top is (–9°C).**



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**C Compare between each in the following :**

1. Simple ecosystem and complicated ecosystem. (Example)
2. Basic oxides and acidic oxides. (According to dissolving in water)
3. Group (1 A) and group (7 A). (Related to its name)

## Question 3

**A Write the scientific term for each in the following :**

1. It is the continuous decrease without compensation in the number of a certain species of living organisms until all members of species die out.
2. It is a series in which metals are arranged in descending order according to their chemical activity.
3. It is the continuous increase in the average temperature of the Earth's near-surface air.
4. They are traces and remains of old living organisms that are preserved in sedimentary rocks.
5. It is used to measure the atmospheric pressure.
6. They indicate the age of sedimentary rocks existed in them.
7. It is the number of protons inside the nucleus of the atom of an element.

**B Complete and balance the following equations :**

1. $Mg + \text{.....} \xrightarrow{\text{dil.}} MgCl_2 + H_2\uparrow$
2. $CO_2 + H_2O \longrightarrow \text{.....}$
3. $Br_2 + 2\,KI \longrightarrow \text{.....} + \text{.....}$

**C What will happen in each of the following cases ... ?**

1. Storing water in plastic bottles.
2. Overuse of freon.
3. Eating fish contains high concentration of lead.

## Question 4

**A Complete the following statements :**

1. The modern periodic table consists of ..... horizontal periods and ..... vertical groups.
2. Archaeopteryx is the link between ..... and .....
3. The highest temperature layer in the atmosphere is ..... and the lowest temperature one is .....
4. Fossils are used in petroleum ..... and determining the age of .....
5. Sodium is kept under the surface of ..... to prevent it from the reaction with .....



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**B Give one example for :**

1. Complete body fossil.
2. A natural protectorate.

**C Locate the position of the following elements in the modern periodic table :**

1. $_{17}Cl$
2. $_{20}Ca$

## 6 Cairo Governorate — Maadi Educational Directorate

**Answer the following questions :**

### Question 1

**A Complete each of the following statements :**

1. The highest temperature atmospheric layer is ....., while the lowest temperature atmospheric layer is .....
2. ..... and ..... are examples of extinct animals.
3. From the pollutants of the ozone layer are ..... and .....
4. During the electrolysis of acidified water by Hofmann's voltameter, the ..... gas evolves at the anode, while the ..... gas evolves at the cathode.

**B What is meant by each of the following ... ?**

1. Chemical activity series.
2. Fossils.

### Question 2

**A Choose the correct answer :**

1. All of the following are from the greenhouse gases except .....
   a. $CO_2$ b. $N_2O$ c. $O_2$
2. Halogens are ..... non-metals.
   a. monovalent b. divalent c. trivalent
3. Meteors are burned in the .....
   a. ionosphere. b. mesosphere. c. stratosphere.
4. The first protectorate established in Egypt is ..... protectorate.
   a. Bluestone b. Panda c. Ras Mohamed

**B Give reasons for :**

1. The presence of hydrogen bond between water molecules.
2. The simple ecosystem is affected strongly at the absence of one of its species found in it.
3. The lower part of the stratosphere is suitable for flying the aeroplanes.



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## Question 3

**A Write the scientific term :**

1. The scientist who discovered that the nucleus of the atom contains positively charged protons.
2. The fossils that are found in the limestone rocks of Mokattam mountain indicate that it was a sea floor since more than 35 million years ago.
3. Group of food chains connected with each other.
4. The ability of the atom in covalent molecule to attract the electrons of the chemical bond towards itself.

**B Locate the position of each of the following elements in the modern periodic table :**

1. $_{18}Ar$ 2. $_{7}N$

**C Write balanced chemical equation representing each of the following :**

1. The reaction between magnesium and dilute hydrochloric acid.
2. The reaction between chlorine and potassium bromide.

## Question 4

**A Correct the underlined words :**

1. Mendeleev arranged the elements according to their **atomic number**.
2. **Mammoth** fossil is an example of microfossils.
3. Dobson assumed that the natural amount of the ozone equals **100** Dobson units.
4. Alkali metals are **bad** conductors of heat and electricity.

**B Mention the use (importance) of each of the following :**

1. Liquefied nitrogen. 2. Van-Allen belts.

**C Calculate the temperature at the top of a mountain, if the temperature at the mountain base is 36°C and its height is 4 km.**

# 7 Giza Governorate — Lycee El-Haram Language School

**Answer the following questions :**

## Question 1

**A Complete the following sentences :**

1. Fossils are often found in ..... rocks.
2. The alkali metal elements are ..... valent.
3. $Mg + 2HCl \longrightarrow$ ..... + .....
4. Bromine replaces ..... in its salt solution.



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5. Element $_2X$ is located in group ..... in the modern periodic table.
6. Eating fish which contains high ratios of lead causes .....
7. The nanometer = ..... m.

**B Give reasons for :**

1. The global warming has a dangerous effect over the Earth.
2. El-Mokattam's mountain was once a sea floor more than 35 million years ago.

## Question 2

**A Choose the correct answer for the following statements :**

1. Scientist ..... discovered the main energy levels in the atom.
   a. Bohr b. Mendeleev c. Moseley d. Hofmann
2. Aluminium oxide from ..... oxides.
   a. amphoteric b. acidic c. nonmetallic d. basic
3. An example of extinct species .....
   a. panda bear. b. rhinoceros. c. quaga. d. papyrus plant.
4. All are greenhouse gases except .....
   a. $CO_2$ b. $O_2$ c. $N_2O$ d. $CH_4$
5. The air moves ..... in the stratosphere layer.
   a. horizontally b. vertically c. whirlwind motion d. no correct answer
6. All the following elements from semimetals except .....
   a. tellurium. b. silicon. c. boron. d. bromine.
7. There are ..... bonds in a sample of water.
   a. covalent b. hydrogen c. ionic d. covalent and hydrogen

**B Calculate the height of a mountain if the temperature at its foot is 30°C and at its top is (–9°C).**

## Question 3

**A Correct the underlined words in the following statements :**

1. **Insect in amber** is an example of micofossils.
2. Each period in the periodic table ends with **a metal**.
3. **Bald eagle** is from the birds that can't fly because of its small wings.
4. The elements of block **(P)** are organized in 10 groups in the periodic table.
5. **Sodium** is considered as the most active metal in the periodic table.

**B Compare between each of the following :**

1. Mold and trace. (In view of their definitions and example for each)
2. Aneroid and altimeter. (In view of their usage)



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## Question 4

**A Write the scientific term for each of the following statements :**

1. It is the ability of an atom in the covalent compound to attract the bonded electrons to itself.
2. Fossil links between reptiles and birds.
3. Phenomenon appears as brightly coloured light curtains at both the north and the south poles of the Earth.
4. Continuous increase of the average temperature of the air near the surface of the Earth.
5. A kind of water pollution results from mixing of humans and animals wastes with water.
6. Measuring unit of ozone degree.

**B Mention one importance :**

1. Liquefied nitrogen. 2. Ozone layer. 3. Index fossils.

**C Explain the effect of extinction of a species of living organisms on simple ecosystem and complicated ecosystem.**

# 8 Giza Governorate — Talaee Islamic Language School

**Answer the following questions :**

## Question 1

**A Complete the following statements :**

1. The number of groups in p-block is ..... in modern periodic table.
2. Sodium reacts with water to produce ..... gas.
3. From the pollutants of ozone layer are ..... , ..... , ..... and .....
4. The measuring unit of atmospheric pressure is ....., while the measuring unit of ozone degree is .....

**B Calculate the temperature at the sea level if the temperature at height of 7500 m above sea level is (–15°C).**

**C What's meant by ... ?**

1. Greenhouse effect. 2. Fossils.

## Question 2

**A Write the scientific term for each of the following statements :**

1. Element, which is used in food preservation.
2. The region in which satellites orbit around the Earth planet.
3. It is the curved lines that join the points of equal pressure in atmospheric pressure maps.



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4. Two magnetic belts surrounding ionosphere and play an important role in scattering harmful charged cosmic radiation.
5. A bond that exists between water molecules.

**B How can you differentiate between each of the following ... ?**

1. Copper and magnesium. (Use a balanced equation)
2. Carbon dioxide and sodium oxide.

## Question 3

**A Choose the correct answer :**

1. Fossils are found in ..... rocks.
   a. metamorphic b. sedimentary c. igneous d. no correct answer
2. ..... is from the recent extinction animal.
   a. Mammoth b. Panda bear c. Quagga d. Bald eagle
3. Meteors are formed in ..... layer.
   a. ionosphere b. stratosphere c. mesosphere d. troposphere
4. The devices, which is (are) used in measuring the atmospheric pressure is (are) .....
   a. ammeter. b. aneroid. c. altimeter. d. (b) and (c).

**B Mention one difference between :**

1. Mold and cast.
2. Positive ion and negative ion.

**C Mention by the chemical equation the effect of adding :**

1. Bromine to potassium iodide.
2. Dilute hydrochloric acid to carbon.

## Question 4

**A Give reasons for :**

1. Occurrence of old extinction.
2. Ozone layer is formed in stratosphere.
3. Elements of the same group have similar chemical properties.
4. Pure water has no effect on litmus paper.

**B Locate the position of the following element in the modern periodic table :**

1. $(_{2}X)$ 2. $(_{20}Y)$ 3. $(_{8}Z)$

**C Put (✓) in front of the correct statements and or (✗) in front of the wrong ones and correct the incorrect ones :**

1. Water and ammonia are non-polar compounds. ( )
2. Eating fish which contain high percentage of lead causes blindness. ( )
3. Liquefied sodium is used in the preservation of the eye cornea. ( )



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## 9 Giza Governorate — Official Language Schools

**Answer the following questions :**

### Question 1

**A Complete the following sentences :**

1. Mendeleev arranged the elements ascendingly according to ....., while Moseley arranged them ascendingly according to .....
2. The highest temperature layer in the atmosphere is ..... and the lowest temperature one is .....
3. ..... bear is one of the most endangered species.
4. Elements of group (1A) are called .....
5. Ultraviolet rays (UV) have ..... effect, while infrared rays have ..... effect.
6. Most of weather features occur in ..... layer.

**B Locate the position of these elements in the modern periodic table :**

1. $_{20}Ca$ 2. $_{10}Ne$

**C Mention one example for each of the following :**

1. A metalloid element. 2. A greenhouse gas. 3. Extinct species.

### Question 2

**A Write the scientific term for each of the following :**

1. The death of all members of species of living organisms.
2. The metalloid that is used in manufacture of electronics such as computer.
3. A phenomenon that appears as brightly coloured light curtains at the north and south poles of Earth.
4. The elements which have the properties of both metals and nonmetals.
5. The arrangement of elements in a descending order according to their chemical activity.
6. Two magnetic belts that help in scattering of harmful cosmic radiations away from the Earth.

**B Mention one use for each of the following elements in modern technology :**

1. Cobalt 60. 2. Altimeter 3. Ozone layer

**C If the temperature at the sea level equals 30°C, find the temperature at a height of 4 km. above the earth's surface.**



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## Question 3

**A Give reasons for :**

1. Elements of the same group have similar chemical properties.
2. The lower part of the stratosphere is suitable for flying aeroplanes.
3. Water has high boiling point and high freezing point.
4. El-Mokattam's mountain was a sea floor more than 35 million years ago.

**B Choose the correct answer :**

1. The degree of ozone is measured by ..... unit.
   a. picometre  b. par  c. dobson
2. ..... represents the link between reptiles and birds.
   a. Archaeopteryx  b. Fish  c. Quagga
3. ..... protectorate is the first established natural protectorate in Egypt.
   a. Saint Cathrine  b. Ras Mohamed  c. Wadi Hetan
4. Sodium oxide from ..... oxides.
   a. amphoteric  b. acidic  c. basic
5. Each period in the modern periodic table starts with (a/an) ..... element.
   a. metallic  b. inert  c. nonmetallic
6. Meteors are formed in .....
   a. ionosphere.  b. mesosphere.  c. stratosphere.
7. The strongest metal locates in the ..... group.
   a. 2 A  b. 1 A  c. 7 A
8. All of the following are endangered species except .....
   a. panda bear.  b. bald eagle.  c. dodo bird.

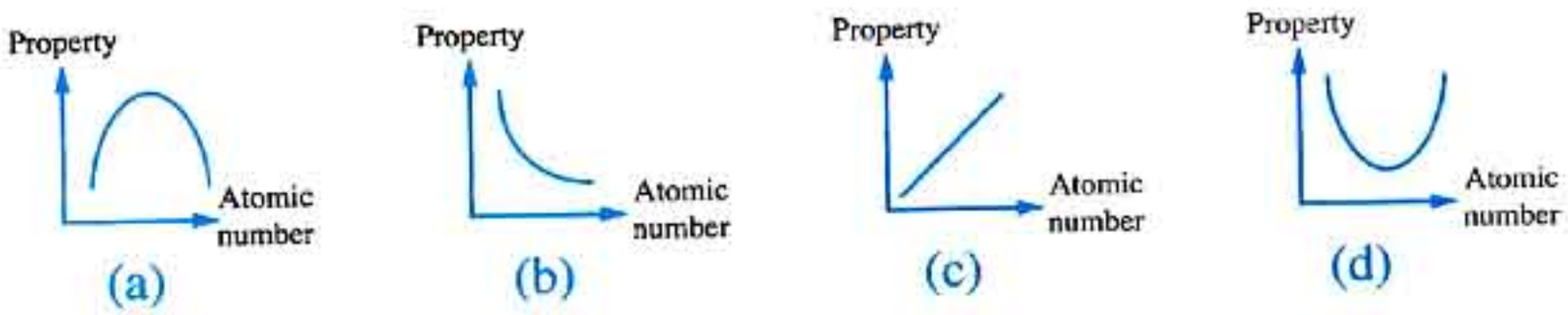
## Question 4

**A Put (✓) or (✗) :**

1. Ozone layer is formed in troposphere layer. ( )
2. Halons are from the pollutants of ozone layer. ( )
3. Fossils are used to indicate the age of sedimentary rocks. ( )
4. The satellites revolve around the Earth in a region called the troposphere. ( )
5. Modern periodic table consists of 7 groups and 16 periods. ( )
6. Water and ammonia are from polar compounds. ( )
7. The solutions produced from dissolving the non-metal oxides in water turn the violet litmus solution into red. ( )
8. Tropical forest is an example of simple ecosystem. ( )

**B Which of the following figures represents ... ?**

Graduation of the atomic size in the third period.






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## 10 Giza Governorate — Pyramids Language Schools

**Answer the following questions :**

### Question 1

**A Write the scientific term :**

1. Elements which have the properties of both metals and nonmetals.
2. Series in which metals are arranged in a descending order according to their chemical activity.
3. Thinning or losing parts of ozone layer above the south pole.
4. It is a region in which the atmospheric envelope is inserted with outer space.
5. They are safe areas established to protect endangered species in their homeland.

**B Mention one function for :**

1. Van-Allen belts.
2. Liquefied nitrogen.

**C Choose the odd word from the following :**

1. Nitrogen oxides - Water vapour - Halons - Methyl bromide.
2. Quagga - Dodo bird - Dinosaur - Bald eagle.

### Question 2

**A Complete the following :**

1. Both sodium ($_{11}$Na) and potassium ($_{19}$K) are located in the same ..... because they have the same number of .....
2. Mesosphere layer is highly rarefied because it contains limited quantities of ..... and ..... gases only.
3. Water has the ability to dissolve some of covalent compounds such as ....., because it can form ..... bond with water molecules.
4. ..... is a type of barometer used to determine the day weather, while ..... is used to measure the elevation from sea level.

**B Give reasons for :**

1. By increasing the atomic number among groups, the atomic size increases.
2. Adding few drops of dilute sulphuric acid to water during its electrolysis by Hofmann's voltameter.

**C Mention one harm for the following :**

1. Global warming.
2. Biological pollution.



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## Question 3

**A Correct the underlined word :**

1. Elements of group 1A are known as **halogens**.
2. **Covalent** bond is a weak electrostatic attraction force which arises among water molecules.
3. **Mammoth** is one of the examples of petrified fossils.
4. **Coral** fossils indicate that the environment where they lived was hot and rainy tropical environment.

**B Problem : Calculate the height of a mountain if temperature at its base is 30°C and at its top is – 9°C .**

**C What will happen if ... ?**

1. Adding some water to magnesium oxide followed by drops of violet litmus solution.
2. The resinous matter, which was secreted by pine trees falls on an insect.

## Question 4

**A Choose the correct answer :**

1. Most of alkali metals have ..... density.
   a. low  b. high  c. same
2. The scientist who discovered that the nucleus of the atom contains positively particles is .....
   a. Mendeleev.  b. Bohr.  c. Rutherford.
3. Pilots prefer to fly their planes in .....
   a. exosphere.  b. stratosphere.  c. thermosphere.
4. ..... is one of the most important reasons of the recent extinction age.
   a. Volcanic eruption  b. Long glacial age  c. Overhunting
5. The unit which used to measure ozone degree is .....
   a. Dobson.  b. millibar.  c. nanometer.

**B Compare between simple and complicated ecosystems (definition only).**

**C Complete the following equations :**

1. $2H_2O \xrightarrow{\text{Electrolysis}}$ ..... + .....
2. $Br_2 + 2KI \longrightarrow$ ..... + .....



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Final Examinations

## 11 Alexandria Governorate — East Educational Zone

**Answer the following questions :**

### Question 1

**A Complete the following statements :**

1. Mendeleev discovered that the atomic weights of element increase on moving from ..... side of the table to the ..... side in horizontal row, which were later called .....
2. Non-metal oxides dissolve in water forming ....., which turn the litmus solution into .....
3. Mesosphere layer is much vacuumed as it contains limited amount of ..... and ..... gases.
4. The atmospheric pressure ..... by increasing the length of air column.
5. Fluorine and chlorine exist in a ..... state, while iodine exists in a ..... state.

**B What is meant by ... ?**

1. Aurora phenomenon.
2. Electronegativity.

**C Write the symbolic balanced chemical equations that illustrate the following reactions :**

1. Reaction of chlorine gas with potassium bromide solution.
2. Reaction of sodium with water.

### Question 2

**A Write the scientific term :**

1. What an old living organisms left during its life indicating its activity.
2. The region between stratosphere and mesosphere and at which the temperature remains constant.
3. A charged layer, which reflects radio waves.
4. The continuous increase in the average temperature of the Earth's near-surface air.
5. Elements, which have the properties of metals and nonmetals.
6. Fossils used in determination of the age of sedimentary rocks.

**B Locate the position of the following elements in the modern periodic table :**

1. $_{19}K$ 2. $_{2}He$

**C Find temperature at a point of height 10000 meters above sea level if temperature at the sea level is 24 C.**



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## Question 3

**A Choose the right answer :**

1. Magnesium oxide is considered as ..... oxides.
   a. acidic  b. nonmetallic  c. basic  d. metallic
2. Complete body fossils of insects are found preserved in .....
   a. amber.  b. ammonites.  c. igneous rocks.  d. mammoth.
3. All of the following cause erosion of ozone layer except .....
   a. aerosols.  b. freon.  c. nitrogen oxides.  d. iron oxides.
4. Satellites orbit in ..... of the Earth.
   a. exosphere  b. thermosphere  c. mesosphere  d. stratosphere
5. All are greenhouse gases except .....
   a. $CO_2$  b. $CH_4$  c. $N_2O$  d. $O_2$
6. The atmospheric pressure on the top of a mountain is ..... the atmospheric pressure at the sea level.
   a. less than  b. more than  c. equal to  d. half

**B Give reasons for :**

1. Elements of the same group have similar properties.
2. Ozone layer acts as a protective shield for living organisms.

**C Mention the importance of :**

1. Halons.
2. Cobalt 60

## Question 4

**A Put (✓) or (✗) each of the following and correct the wrong ones :**

1. Hofmann's voltammeter is used for water ionization. ( )
2. Water molecules are linked together by ionic bond. ( )
3. Sodium is used in the preservation of the eye cornea. ( )
4. Meteors are burnt in thermosphere layer. ( )
5. Dobson is the unit of measuring the ozone degree. ( )

**B Fill the missing spaces in the table :**

| Water pollution | Kind of pollution | Harms |
|---|---|---|
| 1. Discharging of factories wastes in rivers. | ..... | Blindness. |
| 2. ..... | Biological pollution. | ..... |
| 3. Using some water areas in cooling of nuclear reactors. | ..... | Destruction of the marine organisms. |



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## 12 Alexandria Governorate — El-Agamy Educational Zone

**Answer the following questions :**

### Question 1

**A Complete the following statements :**

1. Mendeleev arranged the elements ascendingly according to ....., while Moseley arranged them ascendingly according to .....
2. Ultraviolet rays have ..... effect, while infrared rays have ..... effect.
3. The highest temperature layer in the atmosphere is ..... and the lowest temperature one is .....
4. ..... and ..... are metals, which don't react with water.
5. Archaeopteryx represent the link between ..... and .....

**B Give one use for :**

1. Cobalt 60.
2. Van-Allen belts.

### Question 2

**A Write the scientific term :**

1. Elements having the properties of metals and nonmetals.
2. A water pollutant which causes the death of brain cells.
3. Traces and remains of old living organisms that are preserved in sedimentary rock.
4. A charged layer reflect radio waves.
5. A phenomenon that appear as bright colours at the two poles.

**B Find the temperature at the top of a mountain its height is 3 km, if temperature at the sea level is 20°C.**

### Question 3

**A Choose the correct answer :**

1. All the following are endangered species except .....
   a. panda bear. b. bald eagle. c. quagga. d. rhinoceros.
2. From gaseous elements in group (7 A) is (are) .....
   a. chlorine. b. iodine. c. fluroine. d. (a) & (c) together.
3. The ozone degree is measured in a unit called .....
   a. km. b. °C. c. Dobson. d. millibar.
4. Complete body fossils of insect are found preserved in .....
   a. ammonites. b. amber. c. snow. d. igneous rock.
5. Meteors are formed in ..... layer.
   a. mesosphere b. ionosphere c. exosphere d. stratosphere



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**B** Locate the position of the following elements in the modern periodic table :

1. $_{19}K$ 2. $_{10}Ne$

## Question 4

**A** Correct the underlined words :

1. Each period ends with **a nonmetal**.
2. If the metal lost one electron or more, it will become a **negative** ion.
3. **The desert environment** is an example of the complex ecosystem.

**B** Give reasons for :

1. Water and ammonia are polar covalent compounds.
2. The atomic size increases through group.

**C** Write the balanced chemical equations representing each of the following :

1. Magnesium with hydrochloric acid.
2. Reaction of sodium with water.

## 13 Alexandria Governorate — Montazah Educational Zone

### Answer the following questions :

## Question 1

**A** Complete the following sentences :

1. Ozone layer locates in ..... layer.
2. Radiolaria fossil is an example of ..... , but amber fossil is an example of .....
3. There are ..... bonds between molecules of water.
4. $2H_2O \xrightarrow{\text{Electrolysis}}$ ..... + .....
5. ..... is an instrument used to determine the possible day weather, but ..... to analysis the water by electricity.
6. Ultraviolet radiation has a ..... effect, and the infrared radiation has a ..... effect.

**B** What is meant by ... ?

1. Protectorate.
2. Chemical Activity Series.

**C** What is the importance of ... ?

1. Liquefied nitrogen.
2. Co 60

## Question 2

**A** Choose the correct answer :

1. Scientist ..... discovered the main energy levels in atom.
   a. Bohr b. Mendeleev c. Moseley



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2. Sodium oxide is from ..... oxides.

a. amphoteric b. acidic c. basic

3. When water freezes, its density .....

a. increases. b. decreases. c. doesn't change.

4. When sodium react with water ..... gas evolves.

a. $O_2$ b. $CO_2$ c. $H_2$

**B What is the result of the following ... ?**

1. Presence of Van-Allen belts. 2. Storing water in plastic bottles.

**C Calculate the height of the mountain if the temperature at the base is 30°C and at its top is – 6°C.**

## Question 3

**A Write the scientific term :**

1. The vertical columns in Mendeleev's table.
2. The region where the atmospheric envelope is inserted in outer space.
3. A solid halogen.

**B Write the symbolic balanced chemical equations that illustrate the following reactions :**

1. Magnesium with dill hydrochloric acid.
2. Chlorine gas with potassium bromide solution.

**C Study the opposite figure, then answer :**

| | | |
|---|---|---|
| | A | |
| | $_{11}$B | E |
| | C | |
| | D | |

1. Locate the position of element $_{11}$B
2. What are the atomic number of elements E, C in modern periodic table ?

## Question 4

**A Put (✓) or (✗) and correct :**

1. The air moves horizontally in the lower part of the stratosphere. ( )
2. Copper metal doesn't react with water. ( )
3. Halogens are monovalent metals. ( )
4. The unit of measuring atomic radius is Dobson unit. ( )

**B Give reasons for :**

1. Ammonia is considered as a polar covalent compound.
2. The atomic size of $_{11}$Na is greater than $_{17}$Cl.

**C Explain the role of ultraviolet rays in formation of ozone gas.**



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## 14 El-Qalyoubia Governorate — Memphis Language School

**Answer the following questions :**

### Question 1

**A Complete the following sentences :**

1. $2H_2O \longrightarrow$ ..... + .....
2. Lithium and sodium ..... on the surface of water as their densities are ..... than water density.
3. There are three types of ultraviolet rays, near ultraviolet rays ..... and .....
4. The atmospheric envelope height above sea level is ....., while normal atmospheric pressure equals ..... millibar.
5. ..... + ..... $\longrightarrow MgCl_2 + H_2$

**B Locate the position of the following elements in the modern periodic table :**

1. $_{13}Al$ 2. $_{10}Ne$ 3. $_{17}Cl$

**C Compare between the following :**

Old extinction and recent extinction (concerning its causes).

### Question 2

**A Write the scientific term, which refers to each of the following statements :**

1. The descending arrangement of elements according to their chemical activities.
2. A phenomenon that appears as brightly coloured light curtains at both the poles of the Earth.
3. Remains or traces of organisms that lived in the past were preserved in sedimentary rocks.
4. Continuous decrease in the number of species without compensation until all die out.

**B Write the balanced chemical equations representing the following reactions :**

1. The reaction between magnesium and dilute hydrochloric acid.
2. The reaction between bromine with potassium iodide.
3. The electrolysis of water.

**C Calculate the height of a mountain if the temperature at its base is 30°C and at its top is (– 9°C).**

### Question 3

**A Choose the correct answer :**

1. The scientist ..... had discovered the main energy levels.
   a. Moseley b. Bohr c. Hofmann d. Mendeleev



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2. The modern periodic table consists of ..... horizontal periods.
   a. 7 b. 10 c. 14 d. 18
3. Atmospheric pressure is the ..... of air column of an atmospheric height on a unit area.
   a. mass b. volume c. weight d. density
4. Ozone layer is found in ..... layer.
   a. troposphere b. stratosphere c. mesosphere d. thermosphere
5. ..... is an example of microfossils.
   a. Mammoth b. Ferns c. Foraminifera d. Archaeopteryx

**B Give reasons for :**

1. Sodium is kept under the surface of kerosene.
2. Liquefied nitrogen is used in the preservation of cornea of the eye.
3. The continuity of the ozone layer erosion.

**C What is meant by ... ?**

1. Polar compound.
2. Water pollution.

## Question 4

**A Correct the underlined words :**

1. Each period ends with **a nonmetal**.
2. **Chemical** pollution of water causes many diseases as typhoid and hepatitis.
3. Infrared radiation has a **chemical** effect.
4. Panda bear is considered from **extinct** species.
5. Ozone degree is measured in a unit **nanometer**.

**B Mention one example for :**

1. Petrified fossils.
2. Natural protectorate found in South Sinai in Egypt.
3. An alkali metal that is kept under surface of paraffin oil only.

**C What happens when ... ?**

1. Adding the purple sunflower solution to a jar has a piece of burning coal.
2. The pollution of water with animals and human wastes.

# 15 Sharkia Governorate — Formal Language Schools

**Answer the following questions :**

## Question 1

**A Complete the following sentences :**

1. From the extinct animals in the old ages ..... and .....



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2. Ultraviolet radiation has a ..... effect and the infrared radiation has a ..... effect.
3. The bond between oxygen and hydrogen atoms in water molecule is ....., while bond among water molecules are .....
4. Fossils are used in ..... exploration and determining the age of .....

**B Give reasons for :**

1. Liquefied nitrogen is used in the preservation of the eye cornea.
2. Elements of group 1A are known as alkali metals.

**C What is the importance of ... ?**

1. Altimeter. 2. Liquid sodium.

## Question 2

**A Write the scientific term :**

1. A series in which metals are arranged in a descending order according to their chemical activity.
2. A kind of elements in which their valence electrons contain less than 4 electrons.
3. The continuous decrease in the number of individuals of the species of organisms without compensation.
4. A phenomena appears as brightly coloured lighted curtains at both poles of the Earth.

**B What is meant by ... ?**

1. Fossils. 2. Metalloid.

**C Locate the position of the following elements in the modern periodic table :**

1. $_{11}Na$ 2. $_{20}Ca$ 3. $_{3}Li$

## Question 3

**A Choose the correct answer :**

1. The elements which occupy the middle block(d) in the periodic table .....
   a. alkali metals. b. transition elements. c. inert elements. d. halogens.
2. The ozone hole increases in ..... of each year.
   a. October b. September c. December d. January
3. The hottest atmospheric layer is the .....
   a. troposphere. b. stratosphere. c. mesosphere. d. thermosphere.
4. The scientist who discovered the main energy level is .....
   a. Mendeleev. b. Bohr. c. Moseley. d. Rutherford.
5. Fossils are often found in ..... rocks.
   a. metamorphic b. sedimentary c. volcanic d. igneous



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**B Write the symbolic chemical equations for the following reactions :**

1. Dissolving of magnesium oxide in water.
2. The reaction between chlorine gas and potassium bromide.
3. The electrolysis of water.

**C Calculate the height of mountain if the temperature at its foot is 30°C and at its top is (–9°C).**

## Question 4

**A Put (✓) or (✗) and correct the wrong ones :**

1. The number of known elements till now is 92 elements. ( )
2. Each period starts with a weak metal. ( )
3. The pilots prefer to fly in mesosphere. ( )
4. Papyrus is considered as an extinct plant. ( )

**B Compare between troposphere and mesosphere layers.**

**C Explain the effect of extinction of species of living organisms on :**

1. Simple ecosystem.
2. Complicated ecosystem.



**Answer the following questions :**

## Question 1

**A Write the scientific term for each of the following :**

1. The elements which have the properties of both metal and nonmetal.
2. The ability of the atom to attract the electrons of the chemical bond to itself.
3. A molecule is formed from combining an atom of element with molecule of the same element.
4. They are traces and remains of old living organisms that are preserved in sedimentary rocks.
5. Weight of air column of an atmospheric height on unit area.
6. They are safe areas established to protect endangered species in their homeland.

**B Locate the position of the following in the modern periodic table :**

(Period, group and its block)

1. $_{2}X$
2. $_{9}Y$

**C Answer the following :**

1. If the temperature at the sea level is 30°C, Calculate the temperature at a height of 500 m.
2. Write the balance chemical equation which express :
   (a) Reaction of bromine with potassium iodide.
   (b) Electrolysis of water.



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## Question 2

### A Complete the following sentences :

1. ..... and ..... are from greenhouse gases.
2. Mendeleev arranged the elements ascendingly according to their ....., while Moseley arranged the elements ascendingly according to their .....
3. Archaeopteryx represents the link between ..... and .....
4. The ultraviolet radiations have a ..... effect, while the infrared radiations have a ..... effect.
5. The type of bond in the water molecule is ....., while the bond between water molecules is .....

### B Give reasons for :

1. The high boiling point of water.
2. Stratosphere layer is important for human's life.
3. Dodo bird was an easy target for hunters.
4. Element in the same group have similar chemical properties.

### C Mention one example of :

1. Basic oxide.
2. A petrified fossil.
3. Halogen in liquid state.

## Question 3

### A Choose the odd word out, then write the scientific term for the rest words :

1. Nitrogen oxide / Water vapour / Freon / Halon.
2. Ibis bird / Dodo bird / Panda bear / Bald eagle.
3. Floods / Forests fire / Drought waves / Ozone hole.

### B Mention the importance of :

1. Barometer.
2. Nummulite fossils.
3. Cobalt 60.
4. Van-Allen belt.

### C What happens when ... ?

1. There is no ionosphere layer at the end of thermosphere.
2. Decreasing water temperature to less than 4°C.
3. Increasing atomic number in period three (concerning the metallic and non-metallic property).

### D What is meant by ... ?

1. Global worming phenomenon.
2. Polar compound.
3. Fossil record.
4. Chemical Activity Series.



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## Question 4

### A Choose the correct answer :

1. From microfossils .....
   a. ferns. b. foraminifera. c. radiolaria. d. (b) and (c).
2. Increasing the concentration of ..... in drinking water cause blindness.
   a. lead b. arsenic c. mercury d. chlorine
3. The temperature at the top of mesosphere layer reachs .....
   a. 100°C b. – 60°C c. – 90°C d. 1200°C
4. Ozone layer allows 100% of ..... ultraviolet rays to penetrate.
   a. near b. medium c. far d. (a , b)
5. Complete body fossils of insects found preserved in .....
   a. ammonites. b. igneous rocks. c. snow. d. amber.
6. Atmospheric pressure at tropopause equal ..... mb.
   a. 100 b. 1000 c. 0.01 d. 0.001

### B Put (✓) or (✗) and correct the wrong ones :

1. Overuse of methyl bromide as insecticide causes increasing of erosion of ozone layer. ( )
2. Hydrogen evolves at positive pole in Hofmann's voltameter. ( )
3. Burning carbon produces basic oxide. ( )
4. Coral fossils indicate that their environment was clear warm shallow seas. ( )

### C Answer the following :

1. Compare between fluorine and cesium.
   (Concerning the atomic size and the kind of the formed ion)
2. What are the reasons of the extinction in recent ages ? (Write two reason only)

## 17 Ismailia Governorate — Science Inspectorate

### Answer the following questions :

## Question 1

### A Complete the following sentences with suitable words :

1. The suitable medium to from a mammoth fossil is .....
2. Mendeleev arranged the elements in an ascending order according to their ....., while Mosely arranged them ascendingly according to .....
3. Fluorine and chlorine are found in ..... state.
4. ..... is the first protectorate established in Egypt.



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PART 3

5. From the pollutants of ozone layer are ..... compounds that are used in air conditioner sets.
6. Increasing the concentration of mercury in drinking water causes .....
7. The highest temperature layer in the atmosphere is the ....., while the ..... layer is the most thin one.
8. Metal oxides are ..... oxides, while nonmetal oxides are ..... oxides.

**B Write the number which indicates each of the following :**

1. The number of blocks in the modern periodic table.
2. The number of oxygen atoms in ozone molecule.
3. The normal atmospheric pressure at the sea level (in mb).

## Question 2

**A Give reasons for :**

1. Ozone layer is formed in stratosphere.
2. Petrified woods are considered as fossils although they look like rocks.
3. The atomic size of the elements of the same group increases by increasing their atomic number.
4. The simple ecosystem is affected strongly by the absence of one of its species.

**B Write the scientific term :**

1. The continuous increase in temperature of the Earth's near-surface air.
2. A series in which metals are arranged in a descending order according to the chemical activity.
3. The region between stratosphere and mesosphere at which temperature remains constant.
4. The radioactive element used in food preservation.

**C Complete the following equations :**

1. $2Na + 2HOH \longrightarrow ..... + H_2$
2. $Br_2 + 2KI \longrightarrow ..... + I_2$

## Question 3

**A Choose the correct answer for the following :**

1. All the following metals react with water except .....
   a. K  b. Cu  c. Na  d. Mg
2. Ozone layer doesn't allow the passage of ..... ultraviolet rays.
   a. near  b. medium  c. far  d. no correct answer
3. There are ..... bonds between water molecules.
   a. hydrogen  b. covalent  c. ionic  d. all the previous



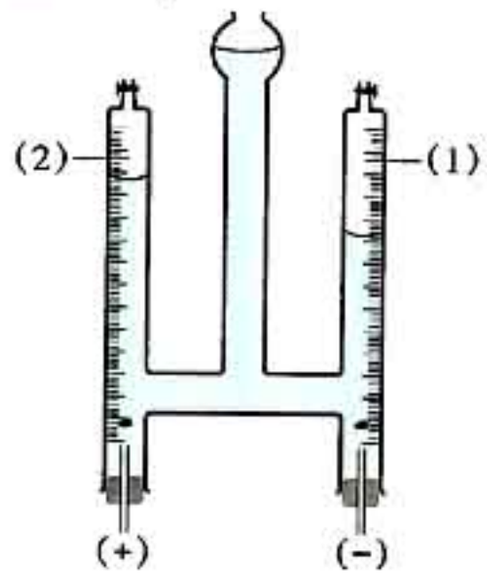
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كتاب المعاصر موقع ذاكرولى التعليمى الصف الثانى الاعدادى

4. Ionosphere is surrounded by ..... belts.
a. electric b. magnetic c. thermal d. no correct answer

5. Fossils are found in ..... rocks.
a. igneous b. sedimentary c. metamorphic d. all the previous

6. All the following gases are greenhouse gases except .....
a. $CO_2$ b. $O_2$ c. $N_2O$ d. $CH_4$

**B From the opposite figure, answer the following questions :**




1. This apparatus is called .....
2. Label the figure.
3. Find the volume of gas (1) if the volume of gas (2) is 10 $cm^3$

**C Locate the position of each of the following in the modern periodic table :**

1. $_{12}Mg$ 2. $_{19}K$

## Question 4

**A Put (✓) in front of right statement and (✗) in front of wrong one :**

1. Establishing gene banks is a way to protect living organisms from extinction. ( )
2. Chemical activity of group 1 A elements increases as atomic size increases. ( )
3. Water molecule is a non-polar compound. ( )
4. Ferns fossils indicate that the environment where they lived was a sea floor. ( )
5. Methyl bromide gas is used as insecticide. ( )
6. Density of ice is more than that of water. ( )
7. Stratosphere is the coldest layer in the atmosphere. ( )

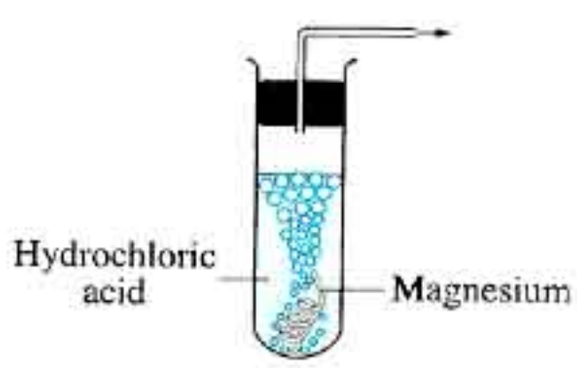
**B Mention one example of the following :**

1. Old extinct animal. 2. Endangered plant. 3. Alkali metal element.

**C If the temperature at the base of a mountain is 40 C° , find the temperature at its top if its height is 2 Km.**

**D Examine the figure, then answer the questions :**

1. Write the chemical equation represents the reaction.
2. What the name of the produced gas ?






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PART 3

## 18 Port-Said Governorate — El-Qadessia Languge School

**Answer the following questions :**

### Question 1

**A Complete the following phrases :**

1. The type of bond in the water molecule is ....., while the bond between water molecules is .....
2. $Cl_2 + 2\,KBr \longrightarrow$ ..... + .....
3. Fossils are used in ..... exploration and determining the age of .....
4. Carbon dioxide gas is ..... oxide, while magnesium oxide is ..... oxide.

**B Calculate the height of a mountain given that the temperature at its base = 40°C and at its top = −12°C.**

**C Give reasons for :**

1. Water and ammonia are polar compounds.
2. Cobalt 60 is used in the food preservation.
3. Ionosphere layer is important for radio stations.

### Question 2

**A Write the scientific term for each of the following statements :**

1. The traces and remains of the old living organisms which are preserved in sedimentary rocks.
2. The elements that have the properties of metals and nonmetals.
3. They are two belts surround ionosphere and help in scattering the harmful cosmic radiations.
4. Safe places that are specified to protect the endangered species in their natural environment.

**B Locate the position of each element in the modern periodic table :**

1. ($_{20}$Ca)  2. Sulphur ($_{16}$S)  3. ($_{2}$He)

**C Compare between group (1A) and group (7A).**

(according to : Name - valency - kind of formed ions)

### Question 3

**A Choose from column (B) what suits column (A) :**

| (A) | (B) |
|---|---|
| 1. Altimeter | a. the layer that has all weather phenomena. |
| 2. Thermosphere | b. a suitable layer for aeroplanes flying. |
| 3. Troposphere | c. a device used to measure the altitude of planes. |
| 4. Stratosphere | d. the hottest layer in the atmospheric envelope. |



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**B What happens when ... ?**

1. Drinking water polluted with mercury.
2. Increasing the ratio of greenhouse gases in the atmosphere.
3. Adding the violet litmus solution to a jar has a piece of burning coal. (write the symbolic balanced equation).

**C Put (✓) in front of the correct statement and (✗) in front the incorrect one, then correct the wrong ones :**

1. Panda bear is an example of extinct species. ( )
2. The main energy levels had discovered by Bohr. ( )
3. Ultraviolt radiation has a thermal effect. ( )
4. The mold is a copy of external shape of the shell. ( )

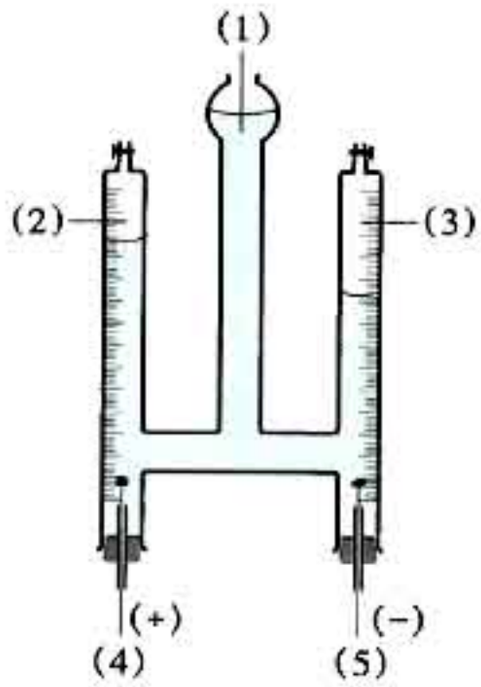
## Question 4

**A Choose the correct answer for the following :**

1. ..... is an example of complete body fossils.
   a. Mammoth b. Ferns c. Coral d. Foraminifera
2. ..... react very slowly with cold water.
   a. K and Na b. Ca and Mg c. Zn and Fe d. Cu and Ag
3. ..... is an example of endangered living organisms.
   a. Mammoth b. Dodo c. Dinosaur d. Bald eagle
4. The snow crystal has ..... shape.
   a. octagonal b. hexagonal c. pentagonal d. quadrilateral

**B Look at the opposite figure, then answer :**

1. Mention the name of the apparatus.
2. Label the figure.
3. Calculate the volume of the gas that evolves at the positive pole if the volume of the gas at the negative pole is 20 $cm^3$




**C What is the importance of the following ... ?**

1. Liquefied nitrogen.
2. Nummulite fossil.
3. Silicon.
4. Aneroid.



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PART 3

## 19 Damietta Governorate — Official Language Schools

**Answer the following questions :**

### Question 1

**A Complete the following sentences :**

1. Each period in the modern periodic table starts with ..... and ends with .....
2. There are ..... bonds between water molecules, while the bonds between atoms in water molecules are ..... bonds.
3. Archaeopteryx represents the link between ..... and .....
4. Ionosphere is surrounded by two magnetic belts known as ..... belts that play an important role in .....
5. Alkali metals are located in group ..... but halogens are located in group ..... in the modern periodic table.

**B Mention the importance of each of the following :**

1. Ozone layer.
2. Altimeter.
3. Liquefied nitrogen.

**C Locate the position of the following elements in the modern periodic table : (With drawing)**

1. $_{16}S$
2. $_{13}Al$
3. $_{10}Ne$

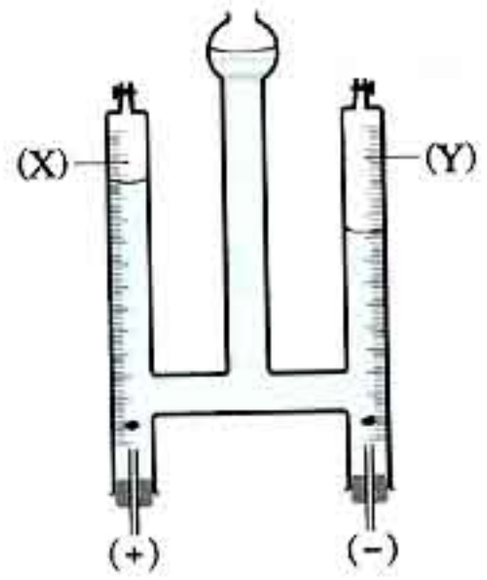
### Question 2

**A Write the scientific term for the following :**

1. The ability of atom in covalent molecule to attract the bond electrons to it.
2. Continuous increase of the average temperature of the air near the surface of the Earth.
3. The death of all members of certain species of living organisms.
4. A type of ultraviolet radiations that is absorbed mostly (95%) in the ozone layer.
5. Safe places established to protect endangered species in their natural environment.
6. A block in the periodic table that contains groups from (3A) to (7A).

**B From the opposite figure, answer the following :**

1. What's the name of this apparatus ?
2. Letter (X) on the figure represents .....
3. Letter (Y) on the figure represents .....
4. Write the symbolic balanced chemical equation.






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**C Calculate the temperature at the top of a mountain if its height is 4 km and the temperature at its foot is 30°C.**

## Question 3

**A Choose the correct answer :**

1. The scientist who discovered the main energy levels is .....
   a. Moseley. b. Bohr. c. Hofmann. d. Mendeleev.
2. ..... is considered the midway between horse and zebra.
   a. Quagga b. Bald eagle c. Panda bear d. Rhinoceros
3. The coldest atmospheric layer is .....
   a. troposphere. b. stratosphere. c. mesosphere. d. thermosphere.
4. Complete body fossils of insects are found preserved in .....
   a. ammonites. b. amber. c. igneous rocks. d. ambergris.
5. ..... react very slowly with cold water.
   a. K and Na b. Cu and Ag c. Zn and Fe d. Ca and Mg

**B Write the symbolic balanced chemical equations which express the following reactions :**

1. Dissolving of magnesium oxide in water.
2. Carbon dioxide with water.
3. Bromine with potassium iodide.

**C Mention the harms of :**

1. Storing water in plastic bottles.
2. Far ultraviolet rays on human.
3. Drinking water contains high concentration of mercury.

## Question 4

**A Give reasons for :**

1. The lower part of stratosphere is suitable for flying aeroplanes.
2. Rhinoceros is from the endangered species.
3. Ionosphere layer is important for wireless communications.
4. Sodium fires do not put off with water.

**B What is meant by ... ?**

1. Dobson.
2. Chemical Activity Series.
3. Petrification.

**C Correct the underlined words :**

1. Infrared radiations has a **chemical** effect.
2. Panda bear is considered from **extinct** species.
3. Meteors burn in **thermosphere** layer.



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الصف الثانى الاعدادى موقع ذاكرولى التعليمى كتاب المعاصر

PART 3

## 20 Kafr El-Sheikh Governorate — Science Inspectorate

**Answer the following questions :**

### Question 1

**A Complete the following statements :**

1. The hottest atmospheric layer is ..... and the coldest atmospheric layer is .....
2. Ultraviolet radiation has a ..... effect, and the infrared radiation has a ..... effect.
3. Archaeopteryx represents the link between ..... and .....
4. Mendeleev arranged the elements ascendingly according to ....., while Moseley arranged them ascendingly according to .....
5. $Br_2 + 2\ KI \longrightarrow$ ..... + .....

**B Explain the behavior of these element with water :**

1. Sodium.
2. Silver.

**C Mention one example for :**

1. Microfossils.
2. Extinct species.

### Question 2

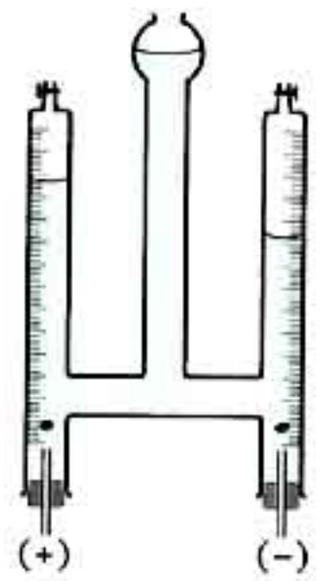
**A Choose the correct answer :**

1. Complete fossils of mammoth are found preserved in .....
   a. ammonites. b. amber. c. snow.
2. The ..... is/are used in extinguishing fires.
   a. methyl bromide gas b. halons c. nitrogen oxide
3. All the following elements from metalloids except for .....
   a. silicon. b. bromine. c. boron.
4. The elements of group (1A) are known as .....
   a. alkali metals. b. halogens. c. alkaline Earth metals.
5. Metal oxides are ..... oxides.
   a. acidic b. basic c. amphoteric
6. All of the following are greenhouse gasses except .....
   a. $CH_4$ b. $N_2O$ c. $O_2$
7. The scientist ..... discovered the main energy levels of the atom.
   a. Bohr b. Mendeleev c. Newton
8. The first established natural protectorate in Egypt is .....
   a. petrified forest. b. Wadi Hetan. c. Ras Mohamed.



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كتاب المعاصر موقع ذاكرولى التعليمى الصف الثانى الاعدادى

**B Study the opposite figure , then answer the following questions :**




1. Mention the name of this apparatus.
2. Write the chemical equation that shows the chemical reaction.
3. What is the volume of gas which burns with a pop sound when you approach a glowing splint to it if the volume of the other gas is 6 $cm^3$ ?

**C Give reasons for :**

1. Elements of the same group have similar properties.
2. Liquefied nitrogen is used in the preservation of the cornea of the eye
3. The lower part of stratosphere is suitable for flying aeroplanes.

## Question 3

**A Write the scientific term :**

1. The descending arrangement of elements according to their chemical activity.
2. Traces and remains of living organisms that are preserved in sedimentary rocks.
3. Decrease in the thickness of the ozone layer.
4. The two magnetic belts that help in dispersing the harmful cosmic radiation.
5. The ability of the atom to attract the electrons of the chemical bond towards itself.
6. The radioactive element which is used in food preservation.

**B Locate the position of the following elements in the modern periodic table :**

1. ($_{19}K$) 2. ($_{9}F$) 3. ($_{5}B$) 4. ($_{10}Ne$)

**C Compare between :**

Simple ecosystem and complicated ecosystem.
(according to : Number of members - example)

## Question 4

**A Put (✓) or (✗) in front of each of the following :**

1. The air moves vertically in the troposphere layer. ( )
2. Ice crystals have pentagonal shapes. ( )
3. In the period, as the atomic number increases the metallic property increases. ( )
4. The fossil record indicates the age of the sedimentary rocks. ( )
5. The ozone degree is measured by unit called Dobson. ( )

**B Calculate the height of a mountain if the temperature at its base is (30°C) and the temperature at its top is (– 9°C).**

**C Write the symbolic balanced chemical equations which express the reaction of :**

1. Carbon dioxide with water.
2. Magnesium with dil. hydrochloric acid.



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كتاب المعاصر موقع ذاكرولى التعليمى الصف الثانى الاعدادى

PART 3

## 21 El-Behira Governorate — Ismail Elhabrouk Formal Language School

**Answer the following questions :**

### Question 1

**A Complete the following statements :**

1. The atomic size is measured by ..... , but the atmospheric pressure is measured by .....
2. Eating fish which contains high ratios of lead causes ..... , but drinking water which contains high ratios of mercury leads to .....
3. Ultraviolet radiation has a ..... effect, but the infrared radiation has a ..... effect.
4. From the examples of complete body fossils are ..... and .....

**B What happens in each of the following cases ... ?**

1. Decreasing water temperature to 2° C.
2. Increasing the ratio of nitrogen oxides in the atmosphere.
3. Silica matter replaces wood material part by part of an old tree.

**C Calculate the height of mountain if the temperature at its bottom is (30°C) and at its top (– 9°C).**

### Question 2

**A Write the scientific term for each of the following :**

1. It is a series in which metals are arranged in a descending order according to their chemical activity.
2. A region separates between stratosphere and mesosphere where temperature is rather constant.
3. Fossils of the organisms that lived a short period of time in the past and become extinct.

**B Mention one use or importance for each of the following :**

1. Liquified nitrogen.
2. Altimeter.
3. Halons.

**C From the opposite table which represents the properties of four elements, mention the symbol which represents an element from :**

1. Alkali metal ..... , then indicates its group in periodic table.
2. Halogen ..... , then indicates its group in periodic table.
3. A metal ..... its oxide dissolves in water to from magnesium hydroxide.
**(Show the balanced chemical equation)**

| Element symbol | Behaviour with water | Physical state | Density gm/cm$^3$ |
|---|---|---|---|
| A | dissolve | gas | 0.003 |
| B | react | solid | 3.59 |
| C | react instantly | solid | 0.86 |
| D | react very slowly with cold water | solid | |



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## Question 3

**A Choose the correct answer :**

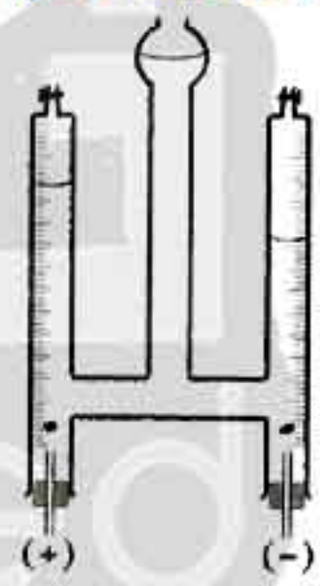
1. Degree of ozone under STP condition is ..... Dobson.
   a. 100 b. 200 c. 300 d. 400
2. Fossils are found in ..... rocks.
   a. metamorphic b. sedimentary c. igneous d. volcanic
3. Inert gases are located in the ..... block.
   a. s b. p c. d d. f
4. ..... protectorate is the first natural protectorate in Egypt.
   a. Saint Catherene b. Ras Mohamed c. Wadi Hetan d. Petrified forest

**B Give reasons for :**

1. Ionosphere is important for wireless comunications.
2. High boiling and freezing point of water.
3. Removing trees of tropical forests is one of the most important factors of extinction.

**C From the opposite figure which illustrates Hofmann's voltameter used in electrolysis of water :**

1. Write the chemical equation which illustrates the chemical reaction ?
2. What is the volume of gas which burns with a pop sound when you approach a glowing splint to it if the volume of the other gas is 5 $cm^3$ ?
3. Write the name of elements, which are collected at the cathode and anode.




## Question 4

**A Correct the underlined words in the following statements :**

1. **Mammoth** represents a link between reptiles and birds.
2. Panda bear is considered from **extinct species**.
3. Meteors burn in **thermosphere** layer.
4. **Methane molecule** is considered as a polar molecule.

**B Compare between :**

1. Mendeleev's periodic table and Moseley's periodic table.
   (In terms of scientific principle of arranging elements)
2. Simple ecosystem and Complicated ecosystem.
   (In terms of : No. of members - example for each)



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PART 3

**C Mention one example for :**

1. A gas from greenhouse gases.
2. The most active metal.
3. An element doesn't react with water.
4. Type of fossils is considered as a guide for existence of petroleum well.

## 22 El-Minia Governorate — Minia Kawmia Language School

**Answer the following questions :**

### Question 1

**A Choose the correct answer :**

1. ..... is the region between stratosphere and mesosphere.
   a. Thermopause b. Mesopause c. Stratopause d. Tropopause
2. Increasing the concentration of ..... in drinking water causes blindness.
   a. mercury b. lead c. arsenic d. chlorine
3. ..... is an example of microfossils.
   a. Mammoth b. Ferns c. Archaeopteryx d. Foraminifera
4. The scientist ..... had discovered the main energy levels.
   a. Moseley b. Bohr c. Hofmann d. Mendeleev
5. Ozone degree is measured in a unit called .....
   a. km. b. $mm^2$ c. nm. d. Dobson.

**B Mention one use of each of the following :**

1. Liquified nitrogen.
2. Hofmann's voltameter.
3. Methyl bromide gas.

**C Mention one example of :**

1. Endangered plant
2. Simple ecosystem.

### Question 2

**A Write the scientific term for each of the following sentences :**

1. Fossils formed by the replacement of wood part by part keeping its shape without change.
2. The continuous increase in the average temperature of air near the surface of the Earth.
3. A bond that exists between water molecules.
4. The curved lines that join the points of equal pressure in atmospheric pressure maps.



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**B Give reasons for :**

1. Ionosphere is important for radio stations.
2. Elements of group (7 A) are known as halogens.
3. Ammonia ($NH_3$) is considered as a polar compound.
4. Formation of ozone layer in the stratosphere layer.

## Question 3

**A Choose from column (B) what suits in column (A) :**

| (A) | (B) |
|---|---|
| 1. Corals | a. is a link between reptiles and birds. |
| 2. Ferns | b. indicate the evolution from simple to complicated life. |
| 3. Nummulites | c. are fossils that indicate that the environment, where they lived was a hot and rainy tropical. |
| 4. Archaeopteryx | d. are fossils that indicate that the environment, where they lived was clear warm shallow seas. |
| | e. are fossils that indicate this area was a sea floor more than 35 million years ago. |

**B Write the balanced chemical equations that illustrate the following reactions :**

1. Reaction of chlorine gas with potassium bromide solution.
2. Magnesium with dilute hydrochloric acid.
3. Carbon dioxide with water.

**C Calculate the height of a mountain if the temperature at its base is (30°C) and at its top is (-9°C).**

## Question 4

**A Correct the underlined words :**

1. **Reproduction** is the continuous decrease without compensation in the number of a certain species of living organisms until all members of species die out.
2. Magnesium oxide is **an acidic oxide**.
3. Amber is an example of **mold** .
4. The atomic size **decreases** in the same group by increasing the atomic number.

**B Compare between :**

The groups and periods (Two points enough).

**C What happens when ... ?**

1. The pollution of water with animal and human wastes.
2. Overuse of freon.
3. Reaction of sodium with water.



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PART 3

## 23 Beni Suef Governorate — Official Language School Sector

**Answer the following questions :**

### Question 1

**A Complete the following statements :**

1. Most of weather features occur in ..... layer, where satellites orbit in ..... layer.
2. Archaeopteryx is the link between ..... and .....
3. The scientist ..... had discover the main energy levels.
4. Sodium oxide is an example of ....., while sulphur oxide is an .....
5. Water has ..... effect on litmus paper.

**B A mountain its height 6000 meter, the temperature on its foot is 30 C. Calculate the temperature at its top**

**C Compare between :**

1. Simple ecosystem and complicated ecosystem (according to : number of members - examples).
2. Elements of group 1 A and elements of group 7 A (according to : name - valency).

### Question 2

**A Write the scientific term :**

1. Fossils exist in the rocks of different areas that indicates the extinction and evoluation of organisms.
2. A type of ultraviolet radiation that is absorbed completely by ozone layer.
3. A water pollutant that causes death of brain cells.
4. A metalloid is used in the manufacturing of electronic devices.
5. The ability of atom in a covalent molecule to attract electrons towards itself .
6. The death of all members of species of living organisms.

**B Explain the behaviour of the following elements with water :**

1. Iron. 2. Silver. 3. Potassium. 4. Magnesium.

**C What is the importance of ... ?**

1. Altimeter. 2. Index fossils. 3. Cobalt 60. 4. Liquid sodium.



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## Question 3

**A Give reasons for :**

1. Establishing the natural protectorates .
2. Water is a polar compound.
3. The high boiling point of water.
4. Stopping manufacturing of ultrasound concorde aeroplanes .
5. Mesosphere layer is highly rarefied layer.
6. Scientist thought about classification of elements.

**B Write the symbolic chemical equation that indicates the following reactions :**

1. Reaction of chlorine gas with potassium bromide.
2. Magnesium with dilute hydrochloric acid.
3. Carbon dioxide with water.

**C Mention one example for :**

1. Endangered bird.
2. Petrified fossils.
3. Bright phenomenon at the Earth poles.
4. Most metallic element in group 1A.

## Question 4

**A Put true or false in front of the following statements :**

1. Methyl bromide used in extinguishing fires. ( )
2. Infrared radiation has a chemical effect. ( )
3. Ionosphere is the lowest layer in temperature. ( )
4. Ozone hole increases in January each year. ( )
5. Water density increases by freezing. ( )
6. Mendeleev arranged elements according to their atomic number. ( )
7. Its preferable to store tap water in empty plastic bottles. ( )

**B Locate the position of the following elements in the periodic table :**

1. $^{1}H_{1}$
2. $_{2}Ne^{4}$
3. $_{20}Ca^{40}$
4. $_{7}N^{14}$
5. $_{3}Li^{7}$

**C Calculate the volume of gas which burns with a pop sound on approaching a glowing splint to it in the cathode of the Hofmann's voltammeter, if the volume of other gas is 6 $cm^3$**



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## 24 Luxor Governorate — Science Inspectorate

**Answer the following questions :**

### Question 1

**A Complete the following statements :**

1. From the extinct species in the recent times are ..... and .....
2. Mendeleev arranged the elements ascendingly according to ....., while Moseley arranged them ascendingly according to .....
3. ..... and ..... are examples of polar compounds
4. Chlorine can replace ..... and ..... in their salt solutions.
5. ..... is an instrument used by pilots in aeroplanes to measure their elevation above sea level.

**B Give reasons for :**

1. Ionosphere is important for radio stations.
2. Naming the petrified forest in Qattamiya with wood mountain.

### Question 2

**A Choose the correct answer :**

1. The largest atom of elements in size is ..... atom.
   a. cesium (Cs) b. fluorine (F) c. bromine (B)
2. The gas evolved on reacting alkali metals with water is .....
   a. oxygen. b. hydrogen. c. nitrogen.
3. Elements of p-block are arranged in ..... groups.
   a. 2 b. 6 c. 10
4. Luminous meteors are formed in ..... layer.
   a. ionosphere b. stratosphere c. mesosphere
5. Complete body fossils of insects are found preserved in .....
   a. ammonites. b. amber. c. igneous rocks.
6. ..... is the region between stratosphere and mesosphere.
   a. Stratopause b. Mesopause c. Tropopause

**B Write the scientific term of each of the following :**

1. Elements, which have the properties of metals and nonmetals.
2. The death of all members of a species of a living organisms.
3. The radioactive element, which is used in the food preservation.
4. Fossils of organisms that had lived for a short period of time in the past and had a wide geographic distribution, then become extinct.



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**C What is meant by ... ?**

1. Atmospheric pressure.
2. Chemical Activity Series.

## Question 3

**A Put (✓) or (✗) with correcting the false ones :**

1. The first real table for classifying elements is the modern periodic table. ( )
2. Each period starts with a strong metal. ( )
3. Wind moves from regions of low atmospheric pressure to that of high atmospheric pressure. ( )
4. Archaeopteryx is a link between reptiles and birds. ( )
5. A hydrogen bond is weaker than a covalent bond. ( )

**B What happens when ... ?**

1. Storing water in plastic bottles.
2. Oxygen atom combines with oxygen molecule.
3. An organism is buried fast after death in snow.

**C Choose the odd word out :**

1. Fluorine - Iodine - Chlorine - Argon.
2. $CO_2$ - MgO - $Na_2O$ - CaO.
3. Rhinoceros - Panda bear - Mammoth - Bald eagle.

## Question 4

**A Mention an example of each of the following :**

1. A fossil of solid mold.
2. Petrified fossils.
3. A natural protectorate.
4. Greenhouse gases.

**B Problem Find temperature at the top of a mountain if it's height is 4 km and the temperature at its foot is 24°C.**

**C Locate the position of the following elements in the modern periodic table :**

1. $_{11}Na$
2. $_{1}H$
3. $_{10}Ne$

# 25 New Valley Governorate — El-Dakhlah Educational Zone

**Answer the following questions :**

## Question 1

**A Complete the following statements :**

1. Mendeleev arranged the elements ascendingly according to ....., while Moseley arranged them ascendingly according to .....
2. Ozone layer is formed in ..... layer, while meteors is formed in ..... layer.



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3. There is ..... bond among the atoms that form water molecule, while there is ..... bond among water molecules.
4. ..... is from extinct birds, while ..... is from endangered birds.
5. $Br_2 + 2\ KCl \longrightarrow$ .....

**B Mention two conditions of fossils preservation (formation) ?**

**C If the temperature at a mountain foot is 35° C. Calculate the temperature at its top if its height is 3 km.**

## Question 2

**A Choose the correct answer :**

1. The scientist ..... had discovered the main energy levels
   a. Moseley b. Rutherford c. Bohr
2. The complete body fossils are found in .....
   a. silica. b. sedimentary rocks. c. snow.
3. ..... gas evolved when sodium reacts with water.
   a. $O_2$ b. $N_2$ c. $H_2$
4. ..... is from extinct mammals.
   a. Dodo b. Rhinoceros c. Quagga
5. Increasing the concentration of ..... in water causes the death of brain cells.
   a. mercury b. lead c. arsenic

**B Mention one use (importance) for each of the following :**

1. Van-Allen belts.
2. Isobar.
3. Altimeter in aeroplanes.

**C Locate the position of the following elements in the modern periodic table :**

1. $_{18}Ar$ 2. $_{11}Na$

**D What are the results based on ... ?**

1. Mixing human and animals wastes with water.
2. Increasing the concentration of greenhouse gases in air.

**E What is the difference between mold and cast ?**

## Question 3

**A Write the scientific term :**

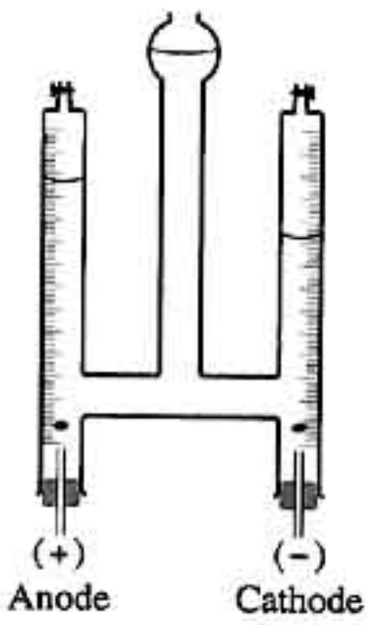
1. Elements, which have the properties of metals and nonmetals.
2. Remains of old organisms that lived in the past for a short period, then became extinct.
3. A charged layer reflects radio waves.
4. Natural safe areas that are established to protect the endangered species.
5. A descending arrangement of elements according to their chemical activity.



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**B The opposite figure represents Hofmann's voltameter, which is used in the water electrolysis :**

1. Write the chemical equation, which expresses the reaction.
2. If the volume of the gas, which burns with a pop sound = 20 $cm^3$. What is the volume of the other gas?
3. What is the name of the gas, which collected at each of the following ?
   a. Anode. b. Cathode.




**C Exclude the unsuitable word and mention what the rest has in common :**

1. Li / Na / Cl / K
2. $Cl_2$ / $O_2$ / $I_2$ / $Br_2$

**D Compare in a table between simple ecosystem and complicated ecosystem.**

## Question 4

**A Give reasons for :**

1. Using liquefied nitrogen in the preservation of the eye cornea.
2. Stopping manufacturing of concorde aeroplanes.
3. Water and ammonia are from polar compound.
4. We should not keep the tap water in plastic bottles.

**B Mention the measuring unit of each of the following :**

1. The wavelength of the ultraviolet radiation.
2. Atmospheric pressure. 3. The degree of ozone.

**C Illustrate with formula and equation only, the role of ultraviolet radiation in the formation of ozone gas.**

**D Choose from column (B) what suits in column (A) :**

| (A) | (B) |
|---|---|
| 1. Atomic size | a. decreases by increasing the height (elevation). |
| 2. Non-metallic property | b. increases as we go done in group 1 A. |
| 3. Atmospheric pressure | c. decreases by decreasing the temperature. |
| 4. Metallic property | d. decreases as we go to right side in period. |
| 5. Water density | e. decreases as we go done in group 7 A. |



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PART 3

## 26 South Sinai Governorate — Tur Sinai Directorate

**Answer the following questions :**

### Question 1

**A Write the scientific term :**

1. Continuous decrease in numbers of species members without compensation until all die out.
2. The descending arrangement of elements according to their chemical activities.
3. The erosion of ozone layer above the south pole.
4. The traces and remains of the old living organisms, which are preserved in the sedimentary rocks.
5. The ability of the atom in the covalent molecule to attract the chemical bond electrons to it.

**B Locate the position of the following elements in the modern periodic table :**

1. $_{18}Ar$
2. $_{20}Ca$

**C Write one example of the following :**

1. Fossil of a complete body.
2. Polar compound.
3. Animal extinct in old time.
4. Mold fossil.
5. A simple ecosystem.

### Question 2

**A Choose the odd word out, then link between the rest words :**

1. Dodo bird - Ibis bird - Bald eagle - Panda.
2. Halons - Methyl bromide - Chlorofluorocarbon compounds - Carbon dioxide.
3. $_{3}Li$ - $_{11}Na$ - $_{19}K$ - $_{12}Mg$
4. Studing life evolution - Petrified forests - Petroleum exploration - Age determination of rocks.
5. $_{6}C$ - $_{9}F$ - $_{17}Cl$ - $_{35}Br$

**B Give reasons for :**

1. The formation of aurora phenomenon.
2. The atomic size of the same group increases by increasing their atomic number.

**C If the temperature at the base of mountain = 13°C, How much is the temperature at its top if the mountain height is 2 km ?**



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## Question 3

**A Correct the underlined :**

1. The first mammoth fossil was discovered preserved in **an amber**.
2. Sodium is kept under the **water** surface.
3. Group **7 A** called alkali metals.
4. **Wadi El-Raiyan** protectorate is the first established protectorate in South Sinai.
5. **Foraminifera** fossil links between reptiles and birds.
6. Meteors are formed in **troposphere** due to friction with air molecules.
7. **Iodine** is from liquid halogens.
8. Transition elements are found **below** the modern periodic table.

**B Match to (A) what is suitable from (B) :**

| (A) | (B) |
|---|---|
| 1. Liquefied nitrogen | a. used in the food preservation. |
| 2. Cobalt 60 | b. used to determine today's weather. |
| 3. Altimeter | c. used to measure the altitude of planes. |
| 4. Aneroid | d. used determine the age of rocks. |
| | e. used in the preservation of the cornea. |

**C If the volume of gas produced from the electrolysis of water at cathode = 8 $cm^3$, Calculate the volume of gas produced at anode and write its name.**

## Question 4

**A Choose the correct answer :**

1. The pure water boils at ..... °C.
   a. 200 b. 40 c. 100 d. 70
2. The modern periodic table consists of ..... periods.
   a. 7 b. 18 c. 17 d. 71
3. Each period in the modern periodic table starts with ..... element.
   a. nonmetalic b. noble gas c. semi-metallic d. metal
4. The ..... fossil indicate that the environment where they lived was clear, warm, and shallow seas.
   a. ferns b. nummulites c. fish d. coral
5. Normal atmospheric pressure = ..... millibar.
   a. 1013.25 b. 76 c. 1.013 d. 760



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6. The crystals of ice take ..... shape.

a. quintet b. quadrilateral c. octogenarian d. hexagonal

7. The solution produced from dissolving the non-metal oxides in water turns the violet litmus solution into .....

a. red. b. blue. c. not changed. d. green.

8. Sodium react with water and ..... gas produced.

a. $H_2$ b. $CO_2$ c. $N_2$ d. $O_2$

## B Compare between the air movement in troposphere and the lower part of stratosphere.

## C What happens when ... ?

1. Water polluted with human and animal wastes.
2. Oxygen molecule absorbed ultraviolet rays.
3. Increasing the ratio of carbon dioxide gas in air.
4. Added dilute hydrochloric acid to magnesium ribbon.

RaNia SaYed



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PART

# 30 Final Exams of some Schools Governorates

## 2019



* Some exams questions have been modified according to the ministry modifications for the first term 2017 - 2018

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Part 3

## 1 Cairo Governorate

Heliopolis Educational Zone
Saint Clare's College

**Answer the following questions :**

### Question 1

**A Complete the following statements :**

1. Elements in group (1A) are called alkali metals as their elements react with ..... forming ..... solutions.
2. The highest temperature layer in the atmosphere is ..... and the lowest temperature one is .....
3. From the examples of complete body fossils are ..... and .....
4. By increasing the atomic number, the value of metallic property ..... in the groups of the periodic table.
5. Elements of group (B) are called ..... elements and they appear from period .....
6. Fluorine and chlorine exist in ..... state, while iodine exists in ..... state.
7. There are ..... bonds between water molecules.

**B** Find the temperature at a point of height 2000 metres above sea level if the temperature at sea level is 23°C.

**C** Give reasons for :

1. The atomic size decreases in periods by increasing the atomic number.
2. Liquefied nitrogen is used in preservation of cornea of the eye.
3. Don't store tap water in empty plastic bottles of mineral water.
4. Pilots prefer to fly their planes at the lower part of stratosphere layer.

### Question 2

**A** Write the scientific term :

1. Continuous decrease in the number of living organisms without compensation until all die out.
2. A liquid metal acts as a heat conductor in nuclear reactors for generating electricity.
3. The traces and remains of old living organisms which are preserved in the sedimentary rocks.
4. The ability of the atom in a covalent molecule to attract electrons of the chemical bond towards itself.
5. The kind of bond which binds oxygen atom with hydrogen atom in water molecule.
6. The weight of air column of an atmospheric height on a unit area.
7. A phenomenon that occurs due to the increase in the percentage of $CO_2$ gas and leads to an increase in the planet Earth's temperature.



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**B What happens if ... ?**

1. Dissolving magnesium oxide in water (write the equation).
2. Passing chlorine gas in potassium bromide solution.
3. Drinking water polluted with mercury.

**C Locate the position of the following elements in the modern periodic table :**

1. $^{20}_{10}Ne$ 2. $^{40}_{20}Ca$ 3. $^{32}_{16}S$ 4. $^{4}_{2}He$

## Question 3

**A Choose the correct answer :**

1. Meteors are formed in .....
   a. mesosphere. b. ionosphere. c. exosphere. d. stratosphere.
2. All these are greenhouse gases except .....
   a. $CO_2$ b. $O_2$ c. $N_2O$ d. $CH_4$
3. From the endangered species is .....
   a. dinosaur. b. bald eagle. c. dodo bird. d. quagga.
4. All of the following metals react with water except .....
   a. K b. Cu c. Na d. Mg
5. Ozone degree is measured in a unit called .....
   a. millibar. b. nanometre. c. dobson. d. picometre.

**B Correct the underlined words :**

1. **Chlorine** element has the smallest atomic size.
2. **Chemical** pollution of water causes many diseases as typhoid and hepatitis.
3. The **thermometer** is an instrument used to measure the atmospheric pressure.
4. **Rutherford** discovered the main energy levels.
5. **Oil** is a covalent compound dissolves in water.
6. **Amphibian** fossil is a link between reptiles and birds.

**C Mention one use for each of the following elements :**

1. Altimeter. 2. Cobalt 60 3. Van-Allen belts.

## Question 4

**A Put (✓) or (✗) and correct the wrong ones :**

1. Mammoth and dinosaur are old extincted animals. ( )
2. Halogens are monovalent elements. ( )
3. Solutions of metal oxides turn blue litmus papers into red. ( )
4. Mendeleev arranged the elements in an ascending order according to their atomic numbers. ( )



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5. Infrared radiations have chemical effect. ( )
6. The atomic size increases in the group by increasing the atomic number. ( )
7. Tropical forest is considered as simple ecosystem. ( )

**B What is meant by ... ?**

1. Polar compounds. 2. Aurora phenomenon. 3. Chemical activity series.

**C Mention two ways to protect living organisms from extinction.**

## 2 Cairo Governorate

Nozha Directorate of Education
Nozha Language Schools

**Answer the following questions :**

### Question 1

**A Complete the following statements :**

1. Elements that locate in the middle of the periodic table are called ..... and they start to appear from the period number .....
2. Mendeleev arranged the elements ascendingly according to ..... , while Moseley arranged them ascendingly according to .....
3. From the negative effects of global warming are ..... and .....
4. Ozone layer is found in ..... layer, while meteors are burnt in ..... layer.

**B Give reasons for :**

1. Water and ammonia are from polar compounds.
2. Water density decreases on freezing.
3. Cobalt 60 is used in food preservation.
4. Chlorine replaces bromine in potassium bromide solution.

**C If the temperature at the sea level is 26°C, find the temperature at the top of a mountain its height is 4 km.**

### Question 2

**A Choose the correct answer :**

1. The volume of oxygen evolved during electrolysis of water is ..... the volume of hydrogen.
   a. equals b. half c. twice d. four times
2. Bilharzia is from the harms resulted from ..... water pollution.
   a. chemical b. thermal c. biological d. radiant
3. ..... fossils indicate the environment where they lived was tropical, hot and rainy.
   a. Ferns b. Nummulites c. Coral d. Dinosaurs



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4. Three elements in the same period (A : non-metal , B: metal, C: metalloid), which of the following represents their correct arrangement in the period from left to right ? .....

a. | B | C | A |  b. | A | B | C |  c. | B | A | C |  d. | C | A | B |

**B Compare between :**

1. Simple ecosystem and complicated ecosystem. (According to definition - example).
2. Reasons of old extinction and recent extinction (2 points for each one).
3. Halogens and alkali metals (2 points for each one).

**C Mention the name representing :**

1. A greenhouse gas.
2. A solid halogen.
3. A mold fossil.
4. An endangered plant.

## Question 3

**A Put (✓) or (✗) and correct the wrong ones :**

1. "p" block elements consists of 10 groups. ( )
2. Halons are produced from supersonic planes. ( )
3. Increasing the concentration of mercury in water causes blindness. ( )
4. Some alkalis dissolve in water forming bases. ( )
5. Amber is a complete body fossil. ( )
6. Wadi El-Hetan protectorate is the first established protectorate in Egypt. ( )

**B Mention one importance for :**

1. Van-Allen belts.
2. Liquefied nitrogen.
3. Altimeter.
4. Fossils.

**C In front of you two elements from the periodic table :**

($_{12}Mg$ / $_{17}Cl$)

**a.** Locate them in the periodic table and mention their block.

**b.** Which one has the smallest size ? Why ?

## Question 4

**A Write the scientific term :**

1. Descending arrangement of metals according to their chemical activity.
2. Traces and remains of old living organisms preserved in sedimentary rocks.
3. Coloured bright curtains seen at the two poles.
4. Weight of air column of an atmospheric height on a unit area ($1m^2$).
5. A layer which plays an important role in wireless communications.



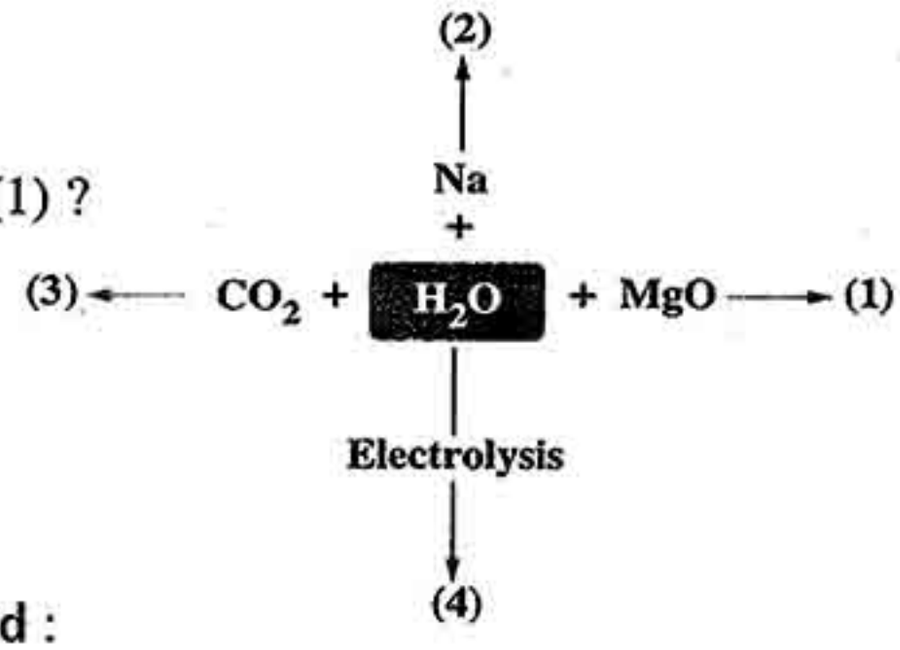
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Part 3

**B** **In the opposite figure :**

1. Write the products of reactions (1) , (2) , (3).
2. What is the type of solution resulted in reaction (1) ?
3. What is the effect of the product of reaction (3) on the litmus paper ? Why ?
4. In reaction (4), hydrogen gas evolves at ..... , while oxygen gas evolves at .....




**C** **Mention the name of the scientist who discovered :**

1. Normal degree of ozone.
2. Protons inside nucleus.
3. Added zero group to the periodic table.
4. Main energy levels.

## 3 Cairo Governorate — Nasr City Educational Directorate

**Answer the following questions :**

### Question 1

**A** **Complete the following statements :**

1. Elements of group (1A) are called ....., but elements of group (7A) are called .....
2. The hottest atmospheric layer is ....., but the coldest atmospheric layer in the atmospheric envelope is .....
3. The transition elements start to appear from the beginning of the ..... period and symbolized by letter .....
4. The bond between hydrogen atom and oxygen atom in water molecule is ..... bond, while bonds among water molecules are ..... bonds.
5. Archaeopteryx represents a link between ..... and .....
6. When the temperature of water becomes less than 4°C, its volume ....., while its density .....
7. ..... are used in extinguishing fires and ..... is used as coolant in cooling devices.
8. In the upper part of stratosphere, ..... layer is found which absorbs ..... rays emitted from the Sun.

**B** **Mention an example for each of the following :**

1. Halogen exists in a solid state.
2. The strongest metallic element.
3. Covalent compound cannot dissolve in water.
4. Trace fossil.



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**C The figure shows a section of the modern periodic table :**

| | | |
|---|---|---|
| X | | |
| $_{11}$L | Z | |
| M | | |
| O | | |

1. What is the atomic number of the element (Z).
2. What is the atomic number of the element (X).
3. Element ($_{11}$L) is located in period ..... and group .....

## Question 2

**A Choose the correct answer :**

1. Eating fish, which contain high concentration of ..... causes the death of brain cells.
   a. mercury b. arsenic c. lead d. iron
2. The electronic configuration of calcium ion ($Ca^{++}$) is similar to .....
   a. $_{18}$Ar b. $_{7}$N c. $_{10}$Ne d. $_{2}$He
3. When mud fills up the shell cavities and solidify, then shell decomposes, ..... is produced.
   a. a petrified wood b. a solid mold c. a cast d. no correct answer
4. The atmospheric envelope is inserted in the outer space in a region known as .....
   a. exosphere. b. ionosphere. c. stratopause. d. mesopause.
5. Ionosphere layer is surrounded by two ..... belts.
   a. ionic b. electric c. heat d. magnetic

**B What happens when ... ?**

1. Storing water in plastic bottles of mineral water.
2. Meteors move at a very high velocity in mesosphere layer.
3. An atom of a nonmetallic element gains one electron or more during the chemical reaction.
4. The melting rate of polar ice increased.
5. Silica matter replaces wood material part by part of an old tree.

**C Compare between :** Basic oxides and acidic oxides.

**D Choose from column (B) what suits it in column (A) :**

| (A) | (B) |
|---|---|
| 1. Liquid sodium | a. is used in preservation of food. |
| 2. Liquefied nitrogen | b. is used in manufacture of electronic devices. |
| 3. Cobalt 60 | c. is used in nuclear reactors. |
| 4. Silicon slides | d. is used in preservation of cornea of the eye. |

## Question 3

**A Complete the following chemical equations :**

1. $2NaBr + Cl_2 \longrightarrow$ ..... + .....
2. $Mg + 2HCl \xrightarrow{dil.}$ ..... + .....
3. ..... + ..... $\longrightarrow 2KBr$



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Part 3

**B Give reason for each of the following :**

1. Dodo bird was an easy target for hunters.
2. Pilots prefer to fly their planes in stratosphere.
3. Although water of oceans freezes at polar zones, the aquatic creatures are still alive.
4. Mammoth fossil is preserved as a complete body fossil.

**C Calculate the temperature at the base of a mountain, if its height is 6 km and the temperature at its top is 10°C.**

**D Choose the odd word out, then write the scientific term of others :**

1. Sodium / Silver / Potassium / Calcium.
2. $N_2$ / $N_2O$ / $CO_2$ / $CH_4$
3. Panda bear / Bald eagle / Dinosaur / Barbary sheep.
4. Hofmann's voltameter / Altimeter / Barometer / Aneroid.
5. Trilobite fossil / Ammonites fossil / Nummulites fossil / Ferns fossil

## Question 4

**A Correct the underlined words :**

1. Petrified wood is considered as **rocks**.
2. Each period in the periodic table starts with **inert gas**.
3. An element which is located in the 3rd period and group (2A), its atomic number is **8**
4. Mixing animals and human wastes with water causes **chemical** pollution.

**B Write the scientific term :**

1. Safe places that are specified to protect the endangered species in their homeland.
2. A phenomenon that appears as brightly coloured light curtains seen at both poles of the Earth.
3. The continuous increase in the average temperature of the air near the surface of the Earth.
4. The ability of the atom in a covalent molecule to attract the electrons of the chemical bond towards itself.
5. The solidified resinous matter, which was secreted by pine trees during old geologic ages.
6. The block that contains the series of lanthanides and actinides.

**C Mention one importance for :**

1. Altimeter.
2. Methyl bromide gas.

**D What do the following numbers indicate ... ?**

1. 300 dobson.
2. 104.5°



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## 4 Cairo Governorate

El-Waily Educational Zone
St. Joseph Maronite Language Schools

**Answer the following questions :**

### Question 1

**A Write the scientific term :**

1. An atmospheric layer at which the air moves vertically.
2. The ability of the atom in the covalent molecule to attract the chemical bond electron to it.
3. A phenomenon looks like colourful light curtains seen in the two poles.
4. The traces and remains of old living organisms which are preserved in sedimentary rocks.

**B Write one use for each of the following :**

1. Liquefied nitrogen.
2. Sodium in liquid state.

**C Locate the position of the following elements in the modern periodic table :**

1. $_{19}K$
2. $_{10}Ne$

### Question 2

**A Complete the following statements :**

1. The atmospheric pressure at sea level equals ..... mb.
2. The ultraviolet rays are three kinds which are ..... , ..... and .....
3. Sodium is kept under the surface of ..... so, as not to react with .....

**B Write one difference between :**

1. Metals and nonmetals.
2. Mesosphere layer and thermosphere layer.
3. Coral fossils and ferns fossils.

**C Write the equation of electrolysis of water.**

### Question 3

**A Give reasons for :**

1. Cesium is considered from the strongest metallic element.
2. The ozone layer acts as a protective shield for living organisms.
3. Amber is considered as suitable medium to form a complete body fossil.

**B What happens when ... ?**

1. Putting a magnesium strip in a test tube containing oxygen.
2. Decrease in water temperature less than 4°C.



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Part 3

**C Mention an example for :**

1. Tracc. 2. Cast. 3. Petrified fossil. 4. Endangered bird.

## Question 4

**A Put (✓) or (✗) and correct the wrong ones :**

1. The troposphere is the first layer in the atmospheric envelope. ( )
2. The millibar is the unit of measuring the ozone degree. ( )
3. The decrease of plants on the Earth leads to the increase in the temperature. ( )
4. The dinosaur is the most famous extinct species recently. ( )

**B Define each of the following :**

1. Chemical activity series.
2. Greenhouse phenomenon.

**C Find the temperature at a point of height 2000 metres above sea level, if the temperature at sea level is 23°C.**

# 5 Cairo Governorate

Rod-El Farag Directorate
Saint Mary's School

**Answer the following questions :**

## Question 1

**A Complete the following statements :**

1. ..... and ..... are metals which don't react with water.
2. Archaeopteryx represents the link between ..... and .....
3. Mendeleev arranged the elements in an ascending order according to ..... , while Moseley arranged them in an ascending order according to .....
4. Troposphere layer contains about ..... of the mass of the atmospheric air and about ..... of atmospheric water vapour.
5. Elements of s-block are located on the ..... of the periodic table and they are arranged in ..... groups.
6. The polarity of water is ..... than that of ammonia as the difference in ..... between elements of water is ..... than that between elements of ammonia.
7. ..... is used in food preservation.
8. The thickness of stratosphere is ..... , while that of mesosphere is .....

**B Find the location of the following elements in the periodic table :**

1. $_{11}Na$ 2. $_{18}Ar$



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**C What happens when ... ?**

1. Dissolving magnesium oxide in water then adding drops of litmus solution to it.
2. Dipping the old insects in amber.
3. Infrared radiations don't reemit back from troposphere layer.
4. There is no difference in electronegativity between hydrogen atom and oxygen atom in water molecule.

## Question 2

**A Write the scientific term of each of the following :**

1. The strongest metal in group (1A).
2. They are symbolized by the letters s , p , d and f
3. A type of ultraviolet radiation that is absorbed completely (100 %) by the ozone layer.
4. Fossils of living organisms lived for a short time in the past in a wide geographical range then became extinct.
5. A unit that measures the degree of ozone.
6. It is a path of energy that transfers from a living organism to another.
7. The elements that occupy the middle block (d) in the periodic table.
8. The halogen that exists in a liquid state.

**B Mention one example for :**

1. Extinct bird in recent time.
2. Greenhouse gases.

**C Mention one importance for :**

1. Liquefied nitrogen.
2. Van-Allen belts.

**D Calculate the height of a mountain if the temperature at the foot of the mountain is 30°C and at the top of this mountain is 10.5°C.**

## Question 3

**A Choose the correct answer :**

1. The scientist ..... had discovered the main energy levels.
   a. Moseley b. Hofmann c. Bohr d. Mendeleev
2. The ..... replaces the wood material, part by part of an old tree.
   a. plastic b. iron c. silica d. copper
3. ..... is an example of microfossils.
   a. Mammoth b. Fern c. Foraminifera d. Coral
4. Mammoth fossil is an example of a ..... fossil.
   a. cast b. mold c. complete body d. petrified
5. All of the following elements are metalloids except .....
   a. tellurium. b. silicon. c. boron. d. bromine.



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Part 3

6. The air in troposphere layer moves .....

a. horizontally. b. vertically. c. inclined. d. no right answer.

7. Which of the following elements is located in the third period ? .....

a. $_{19}K$ b. $_{6}C$ c. $_{3}Li$ d. $_{15}P$

8. Alkali metals have the following properties except they .....

a. have low density. b. conduct electricity.

c. don't react with water. d. conduct heat.

**B On electrolysis of acidified water by Hofmann's voltameter :**

1. What is the name of the gas that evolves at the anode ?
2. Calculate the volume of the gas formed at the cathode, if the volume of the gas that evolves at the anode is 15 $cm^3$.

**C What is meant by ... ?**

1. Extinction.
2. Aurora phenomenon.
3. Ozone hole.
4. Simple ecosystem.

## Question 4

**A Correct the underlined words :**

1. **Nummulites** fossils are used to determine the age of the sedimentary rocks.
2. Eating food containing high percentage of lead causes **blindness**.
3. Moseley put lanthanides and actinides elements **on the left side of** the periodic table.
4. The number of electrons in positive ion is **equal to** that of its atom.
5. Storing the tap water in plastic bottles cause the increase of infection of **hepatitis**.

**B Give reasons for :**

1. Most of weather conditions take place in the troposphere layer.
2. Atomic size of sodium ($_{11}Na$) is greater than that of magnesium ($_{12}Mg$).
3. Adding drops of dilute acid to water during its electrolysis.
4. Pure water doesn't affect blue and red litmus papers.

**C Compare between :** Cast and mold.

**D Write the balanced chemical equation of the following reactions :**

1. Burning a piece of coal in air.
2. Sodium bromide with chlorine.
3. Potassium with bromine.



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6 **Cairo Governorate** Basateen & Dar El-Salam Educational Administration

**Answer the following questions :**

## Question 1

**A Choose the correct answer :**

1. Bilharzia is due to the ..... pollution of water.
   a. biological b. thermal c. chemical
2. The atomic radius is measured in .....
   a. nanometre. b. picometre. c. kilometre.
3. A fossil that plays an important role in petroleum exploration is .....
   a. morgan. b. nummulites. c. foraminifera.
4. The difference in electronegativity between the two elements of a polar compound is .....
   a. zero. b. relatively high. c. small.
5. Ice crystals have ..... shape.
   a. tetragonal b. pentagonal c. hexagonal

**B If the temperature at the base of a mountain is 20.6°C, calculate the temperature at its top if the mountain's height is 8862 m.**

**C Use the figures below to write the correct letter in the space provided :**


(a) Archaeopteryx


(b) Insect in amber


(c) Petrified wood


(d) Foraminifera


(e) Ammonites

| Main characteristics of fossils | Letter |
|---|---|
| 1. An example of complete body preserved from decaying and form fossil. | |
| 2. A rock mold carrying the internal details of the snail. | |
| 3. Minerals replace the organic matter of organism, part by part, without changing its shape. | |
| 4. Used to study life evolution as it represents the link between reptiles and birds. | |
| 5. A good indication of the age of rocks and suitable conditions of petroleum formation. | |



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Part 3

## Question 2

**A Write the scientific term of each of the following :**

1. A table in which the elements are arranged according to their atomic weights.
2. An area where the atmospheric envelope is inserted in outer space.
3. Elements where their valency shell contains more than four electrons.
4. A molecule produced from the union of an oxygen atom and its molecule.
5. A safe place used to protect endangered species from extinction.
6. They indicate the age of sedimentary rocks in which they are found.

**B Study the opposite figures and answer the following questions :**

1. Which figure represents a positive ion ?
2. Which figure represents a neutral atom ?
3. Determine the position of the atom in the periodic table.

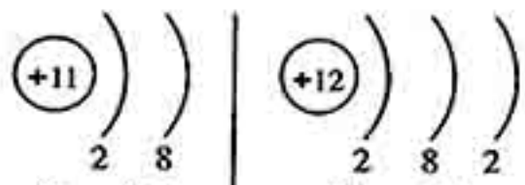


fig. (a) fig. (b)

**C What is the difference between ?**

1. Simple and complex ecosystems.
2. The importance of nummulites and ferns fossils.

## Question 3

**A Correct the underlined words :**

1. Dissolving basic oxides in water produces **acids**.
2. Zero group contains **active** gases.
3. The layer that represents (75%) of the atmospheric air mass is **mesosphere** .
4. Atmospheric pressure is measured by a unit called **dobson** .
5. Radio waves are reflected and transmitted by communication centres in **stratosphere** .
6. From the most important greenhouse gases is **ammonia** .

**B Give reasons for :**

1. Water has high boiling point.
2. Bromine cannot replace chlorine in sodium chloride.
3. Ozone layer acts as a protective shield for living organisms.
4. Global warming phenomenon has negative effects on Earth.

## Question 4

**A The opposite figure shows the reaction of sodium and water :**

1. Write the balanced chemical equation of the reaction.
2. Name the gas produced and how you can test about it.





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**B Mention the importance of :**

1. Liquid sodium.
2. Ras Mohamed protectorate.
3. Altimeter.
4. Coral fossils.

**C Write a balanced symbolic chemical equation for the following reactions :**

1. Carbon dioxide with water.
2. Potassium iodide with bromine.
3. Magnesium with dilute hydrochloric acid.

## 7 Giza Governorate

Boulak El-Dakrour Directorate
Dar El-Hanan Language School

**Answer the following questions :**

### Question 1

**A Complete the following statements :**

1. Moseley put ..... and ..... series below the periodic table.
2. Each period in the modern periodic table starts with ..... and ends with .....
3. The valency of alkali metal elements is .....
4. ..... and ..... are endangered mammals.
5. Fossils are used in ..... exploration and determination the age of .....
6. Fossils always exist in the .....

**B Mention the use of :**

1. Liquid sodium.
2. Cobalt 60.

### Question 2

**A Write the scientific term :**

1. A bond that exists between water molecules.
2. Indicated by the letters K, L, M, N, O.
3. A device used to measure the elevations above sea level.
4. Two magnetic belts help in scattering the harmful cosmic radiations away from the Earth.
5. Safe areas established to protect the endangered species in their homeland.

**B Give reasons for :**

1. Elements of the same group have the same properties.
2. Liquefied nitrogen is used in preservation of cornea of eye.
3. The lower part of stratosphere is suitable for flying planes.
4. The simple ecosystem is significantly affected by the absence of one of its species.



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Part 3

## Question 3

**A Correct the underlined words :**

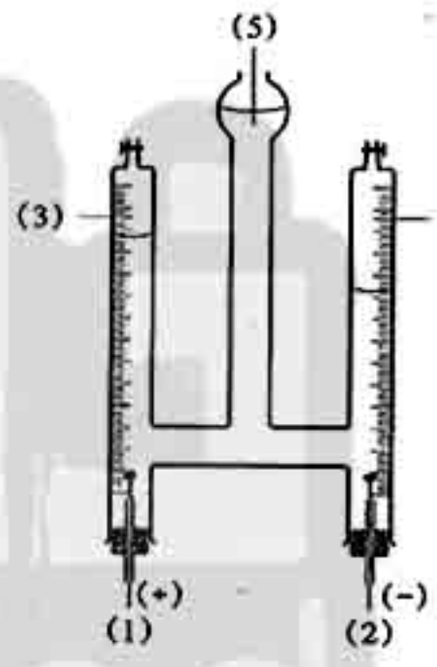
1. The elements with the same physical and chemical properties have been put in **horizontal periods**.
2. All weather phenomena like rains, wind and clouds occur in the **ionosphere**.
3. **Millibar** is the unit of measuring the ozone degree.
4. **Archaeopteryx** fossil is a kind of extinct elephants.
5. **Ammonites** fossils indicate that the environment where they lived was warm clear shallow seas.

**B Calculate the height of a mountain if the temperature at its base is 30°C and at its top is (–9°C).**

## Question 4

**A From the opposite figure :**

1. What is the name of this apparatus ?
2. Label the figure.




**B Locate the position of the following atoms in the periodic table :**

1. $_{10}Ne$ 2. $_{20}Ca$ 3. $_{17}Cl$ 4. $_{1}H$

## 8 Giza Governorate

Omranya Educational Directorate
Al-Farouk Language School

**Answer the following questions :**

## Question 1

**A Write the scientific term :**

1. The number of positive protons inside the nucleus.
2. The product of dissolving nonmetallic oxides in water.
3. The alkali elements.
4. A good polar solvent for most of ionic compounds and some of covalent compounds.
5. Brightly coloured light curtains at both north and south poles of the Earth.



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**B Study the opposite figures, then answer :**

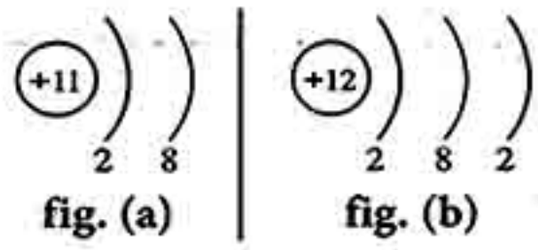


fig. (a) fig. (b)

1. Which one represents : (Positive ion – neutral atom).
2. Locate the position of the element in the periodic table (period – group).

**C 1. If the temperature at the bottom of Everest mountain is 20.6°C. Find the temperature at its top if the height of the mountain is 8862 m.**

**2. Mention an example for each of the following :**

(1) Fossil of a complete body.

(2) Endangered plant.

(3) An extinct bird recently.

## Question 2

**A Give reasons for :**

1. Elements of the same group in the modern periodic table have similar properties.
2. Potassium reacts with water instantly and faster than sodium.
3. Rising of boiling point and freezing point of water.
4. The lower part of stratosphere is suitable for flying planes.
5. Desert ecosystem is considered as a simple ecosystem.

**B 1. A metallic element (X) lies in the third period and group (1A) in the modern periodic table :**

(1) Draw the electronic distribution of this element.

(2) Mention the atomic number of this element.

(3) What is the block that this element belongs to ?

(4) What is the valency of this element ?

**2. Mention one importance for each of the following :**

(1) Slides of silicon.

(2) Van-Allen belts.

**C 1. What happens when ... ?**

(1) The reaction of chlorine with the solution of potassium bromide.

(2) Dissolving magnesium oxide in water.

**2. Mention one difference between :**

(1) Fluorine molecule and helium molecule.

(2) The period number of an element and the group number of an element.

(3) Metals and nonmetals.



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Part 3

## Question 3

**A Correct the underlined words :**

1. Transition elements start from the **second** period.
2. **Inert gases** have the properties of metals and nonmetals.
3. **Hydrogen** used in preserving eye cornea.
4. Fossils are often found in **igneous rocks**.
5. From ozone layer pollutants are **halons** which are used in cooling devices.

**B Write a brief description of :**

1. Global warming.
2. The relation between density of water and its temperature.

**C Choose the correct answer :**

1. The element, whose atomic number is (15) is similar in its chemical properties as the element whose atomic number is .....
   a. 5 b. 7 c. 17 d. 19
2. The measuring unit of the atomic size is .....
   a. micrometre. b. picometre. c. millimetre. d. millibar.
3. Ice crystal has ..... shape.
   a. hexagonal b. octagonal c. quadrant d. pentagonal
4. Meteors are formed in .....
   a. thermosphere. b. mesosphere. c. stratosphere. d. troposphere.
5. Microfossils like .....
   a. mammoth. b. ferns. c. foraminifera. d. archaeopteryx.

## Question 4

**A Complete the following statements :**

1. Sodium is kept under ..... surface to prevent its reaction with .....
2. Troposphere extends above sea level to ..... with thickness about .....
3. Ultraviolet radiations have ..... effect, while infrared radiations have ..... effect.
4. Fossils are used in searching for ..... and indicate the age of ..... rocks.
5. ..... protectorate in USA, where ..... is protected.

**B 1. What is meant by ... ?**

(1) Metalloids. (2) Aurora phenomenon.

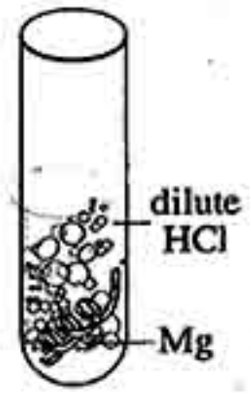
**2. Write the electronic distribution of elements (X , Y) with atomic numbers (10, 9) respectively and then locate them in the modern periodic table.**



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**C** **1. Compare between acidic oxides and basic oxides according to :**
(product that dissolves in water - affect on litmus paper - giving example).

**2. Study the opposite figure, then answer the questions :**
(1) Write the balanced equation.
(2) What happens when approaching a lighted match to the opening of the tube.




## 9 Giza Governorate

6th October Educational Directorate
Om El-Moumeneen Language Schools

**Answer the following questions :**

### Question 1

**A** **Write the scientific term :**
1. Safe areas established to protect the endangered animals.
2. The replica of the internal details of the living organism.
3. Weak electrostatic attraction that arises between the molecules of the polar compounds.
4. It is a phenomenon that appears as brightly coloured curtains seen at the two poles.
5. It is the process of replacing the wood material by silica to form petrified wood.
6. Decrease in the thickness of ozone layer.
7. The descending arrangement of elements according to their chemical activity.

**B** **Calculate the height of a mountain if the temperature at its base is 30°C and at its top is (–9°C).**

**C** **Locate the position of the following elements in the modern periodic table :**
1. $_{17}Cl$ 2. $_{10}Ne$ 3. $_{3}Li$ 4. $_{8}O$

### Question 2

**A** **Give reasons for :**
1. Cesium is the most active metal in group (1A).
2. Sugar dissolves in water.
3. Ozone layer exists in stratosphere layer.
4. The extinction of some animals in recent ages.

**B** **Mention three ways to protect water from pollution.**

**C** **Mention the importance of :**
1. Aneroid. 2. Liquefied nitrogen. 3. Van-Allen belts.



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الصف الثانى الاعدادى موقع ذاكرولى التعليمى كتاب المعاصر

Part 3

**D Give an example for :**

1. Endangered plant.
2. Amphoteric oxide.
3. Liquid element from halogens.
4. Cast fossil.

## Question 3

**A Complete the following statements :**

1. "d" block elements are called the ..... elements.
2. ..... and ..... are from greenhouse gases.
3. There is a ..... bond between hydrogen and oxygen in water molecule.
4. Cobalt 60 has the ability to kill .....
5. The existence of the coral fossils in a certain area indicate that the environment was .....
6. ..... and ..... are from ozone layer pollutants.
7. The strongest nonmetal lies in group .....
8. When the atomic number increases in the same period, the metallic property .....

**B Compare between :**

1. Simple ecosystem and complicated ecosystem.
2. Basic oxides and acidic oxides.

## Question 4

**A Choose the correct answer :**

1. The degree of ozone under STP condition is..... Dobson.
   a. 100 b. 200 c. 300
2. The first protectorate in Egypt is ..... protectorate.
   a. Ras Mohamed b. Wadi El-Raiyan c. Panda
3. From the complete body fossils is .....
   a. mammoth. b. nummulites. c. fish.
4. The number of elements in the Earth's crust equals .....
   a. 118 b. 92 c. 120
5. The atmospheric pressure at the top of a mountain equals ..... bar.
   a. 1 b. 0.05 c. 1.88
6. ..... is an example of microfossils.
   a. Ferns b. Foraminifera c. Archaeopteryx

**B Mention the role of the following scientists :**

1. Moseley.
2. Bohr.

**C Complete the equations :**

1. $Cl_2 + 2KBr \longrightarrow$ ..... + .....
2. $2Na + 2H_2O \longrightarrow$ ..... + .....



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10 **Giza Governorate**

Abu El-Nomrous Directorate
Future Generation Language School

**Answer the following questions :**

## Question 1

**A Choose the correct answer :**

1. ..... is/are used in extinguishing fires.
   a. Methyl bromide  b. Halons  c. Nitrogen oxides  d. UV radiation
2. The second layer of atmosphere is called .....
   a. mesosphere.  b. troposphere.  c. stratosphere.  d. thermosphere.
3. The transition elements start to appear from the beginning of the ..... period.
   a. second  b. third  c. fourth  d. fifth
4. All of the following are from endangered species except .....
   a. papyrus plant.  b. bald eagle.  c. quagga.  d. rhinoceros.
5. p-block contains ..... groups.
   a. 10  b. 2  c. 6  d. 8
6. All of the following are greenhouse gases except .....
   a. $CO_2$  b. $O_2$  c. $N_2O$  d. $CH_4$
7. Group (B) contains ..... elements.
   a. halogens  b. nonmetals  c. transition  d. metalloids
8. The inert gas that has the same electronic structure as ($Na^+$) is .....
   a. $_{10}Ne$  b. $_{2}He$  c. $_{18}Ar$  d. $_{17}Cl$

**B Give reasons for :**

1. The lower part of stratosphere is suitable for flying planes.
2. It is difficult to identify semi-metals based on the electronic configuration.

**C If the temperature at the sea level is 39.5°C, find the temperature at the top of a mountain of height 3650 m above the Earth's surface.**

## Question 2

**A Put (✓) or (✗) and correct the wrong ones :**

1. All periods start with a metal element. ( )
2. Hofmann's voltameter is used for water ionization. ( )
3. Mesosphere is the layer which is responsible for burning of meteors. ( )
4. Ozone layer totally absorbs all kinds of ultraviolet radiations. ( )
5. Tellurium is a metalloid. ( )
6. Complicated ecosystem contains two species. ( )
7. Petrified woods look like rocks and are considered as fossils. ( )
8. Altimeter is a kind of barometers. ( )



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الصف الثانى الاعدادى  موقع ذاكرولى التعليمى  كتاب المعاصر

Part 3

**B What do the following numbers indicate ... ?**

1. 118 2. 104.5° 3. 100°C 4. 1013.25 mb

**C Compare in a table between groups (1A) and (7A).**

## Question 3

**A Complete the following statements :**

1. The safe areas established to protect endangered species are called .....
2. ..... causes liver cancer.
3. $MgO + H_2O \longrightarrow$ .....
4. ..... is responsible for the high boiling point of water.
5. The satellites rotate around the Earth in ..... layer.
6. The scientist ..... discovered the main energy levels.
7. Mammoth fossil is preserved in .....
8. Water has ..... effect on litmus paper.

**B What happens when ... ?**

1. Storing water in plastic bottles of mineral water.
2. Increasing the numbers of cars in streets.
3. Element loses an electron.
4. Ozone layer disappeared.

**C Arrange the following elements in an ascending order according to the metallic property and give a reason :**

Sodium ($_{11}Na$) – Magnesium ($_{12}Mg$) – Potassium ($_{19}K$) – Cesium ($_{55}Cs$)

## Question 4

**A Write the scientific term :**

1. The measuring unit of the atomic size of an element.
2. The region between troposphere and stratosphere.
3. The number of protons inside the nucleus of the atom of an element.
4. The halogen which exists in a solid state.
5. Remains of old living organisms that are preserved in sedimentary rocks.
6. The permanent change of water by adding any substance.
7. The descending arrangement of elements according to their chemical activity.
8. They are safe areas established to protect endangered species in their homeland.



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**B** **Locate the position of the following elements in the periodic table (show their configuration) :**

1. Calcium ($_{20}Ca$).
2. Silicon ($_{14}Si$).

**C** **What is meant by ... ?**

1. Ozone layer.
2. Electronegativity.

## 11 Alexandria Governorate — Middle Educational Zone — New S.L.S. "Girls"

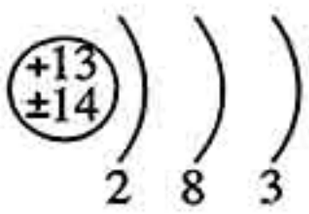
**Answer the following questions :**

### Question 1

**A** **Write the scientific term of each of the following :**

1. The scientist who discovered that the atom contains positive protons in the nucleus.
2. Elements which have properties of metals and nonmetals.
3. Adding any substance to the water which changes its properties, affects the health and life of living organisms.
4. The weight of air column on a unit area ($1m^2$).
5. Two magnetic belts surrounding ionosphere and play an important role in scattering harmful charged cosmic radiations.
6. The continuous increase in the average temperature of the Earth's near surface air due to the greenhouse effect.
7. Traces and remains of old living organisms that are preserved in sedimentary rocks.
8. The continuous decrease without compensation in the number of a certain species until all the members of species die out.
9. The apparatus which is used for water electrolysis.
10. A mammal between horse and zebra that extinct recently due to overhunting.
11. The ability of the atom to attract the electrons of the covalent bond towards itself.

**B** **Look at the opposite figure, then find the location of this element in the modern periodic table. Mention the block of this element.**




### Question 2

**A** **Give reasons for :**

1. Atomic size decreases in the period from left to right.
2. Reaction of potassium with water is stronger than that of sodium with water.
3. Pilots prefer to fly their planes in stratosphere layer.
4. Silicon slides are used in making electronics as computers.



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كتاب المعاصر موقع ذاكرولى التعليمى الصف الثانى الاعدادى

Part 3

**B Choose from column (B) what suits it in column (A) :**

| (A) | (B) |
|---|---|
| 1. $2Na + 2H_2O \longrightarrow$ | a. unit of measuring the thickness of ozone layer. |
| 2. $Br_2 + 2KI \longrightarrow$ | b. is from endangered species. |
| 3. Coral fossils | c. $2NaOH + H_2$ |
| 4. Dobson | d. extinct because it has small wings so, it was easy to get hunted. |
| 5. Dodo bird | e. $2KBr + I_2$ |
| 6. Papyrus plant | f. showed that the environment where they lived was clear, warm and shallow seas. |

**C Correct the underlined words in each of the following statements :**

1. Pure water has **acidic** effect on litmus paper.
2. Ultraviolet radiation has **thermal** effect on the Earth.
3. Increasing the concentration of mercury in water causes **liver cancer**.
4. **Snow** is a solidified resinous matter secreted by pine trees.

## Question 3

**A Find the temperature at a point of height 10 km above sea level, if the temperature at sea level is 24°C.**

**B Complete each of the following statements :**

1. ..... is from the examples of polar compounds because the difference in electronegativity between its elements is relatively .....
2. ..... classified the elements in his table according to their properties and atomic mass.
3. ..... is a type of barometers used to determine the possible day weather.
4. ..... is from the factors that cause extinction of species.
5. Microfossils (foraminifera and radiolaria) help in ..... exploration.
6. $Mg + 2HCl \xrightarrow{dil.}$ ..... + .....
7. ..... and ..... are from greenhouse gases.
8. ..... fossils indicate the age of sedimentary rocks.

## Question 4

**A Choose the correct answer :**

1. ..... protectorate is a natural protectorate in USA where grey bear is protected.
   a. Ras Mohamed  b. Wadi El-Raiyan  c. Bluestone  d. Panda
2. Ozone layer prevents (100 %) of ..... ultraviolet rays from passing to the Earth.
   a. near  b. medium  c. far  d. (a) and (b) together



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كتاب المعاصر موقع ذاكرولى التعليمى الصف الثانى الاعدادى

3. The modern periodic table contains ..... elements.

a. 26 b. 92 c. 100 d. 118

4. Which of the following is an acidic oxide ? .....

a. $CO_2$ b. MgO c. $Na_2O$ d. FeO

5. Which of the following is a radioactive element which is used in food preservation ? .....

a. Liquid sodium. b. Liquefied nitrogen.

c. Cobalt 60. d. Water.

6. Which of the following is correct about alkali metals ? They .....

a. have high density. b. are monovalent.

c. are bad conductors of electricity. d. form negative ions.

7. Water has high boiling point due to the presence of ..... bonds between its molecules.

a. hydrogen b. ionic c. covalent d. metallic

8. ..... added group zero in his table for noble gases.

a. Mendeleev b. Moseley c. Rutherford d. Einstein

9. Which of the following is the halogen that exists in a solid state ? .....

a. Fluorine. b. Chlorine. c. Bromine. d. Iodine.

10. When putting a glass bottle completely filled with water in the freezer, it breaks because when water freezes its ..... increases.

a. temperature b. density c. volume d. acidity

11. Which of the following elements don't react with water ? .....

a. K and Na b. Ca and Mg c. Zn and Fe d. Cu and Ag

12. What is the volume of hydrogen gas evolved from electrolysis of acidified water if you know that the volume of oxygen gas evolved is 2 $cm^3$ ? .....

a. 1 $cm^3$ b. 2 $cm^3$ c. 4 $cm^3$ d. 6 $cm^3$

**B Mention the type of the fossils shown in the following figures :**

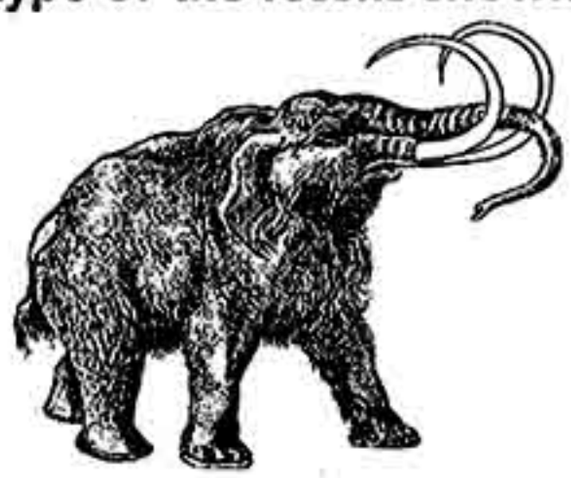


fig. (1)



fig. (2)



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الصف الثانى الاعدادى موقع ذاكرولى التعليمى كتاب المعاصر

Part 3

## 12 Alexandria Governorate — El-Agamy Educational Zone

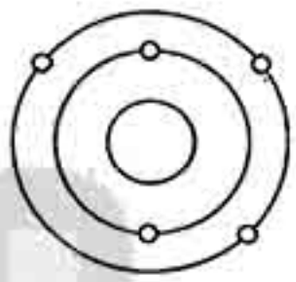
**Answer the following questions :**

### Question 1

**A Complete the following statements :**

1. From types of fossils are ..... and .....
2. The new number for group (6A) is .....
3. $Mg + 2HCl \xrightarrow{dil.}$ ..... + .....
4. The coldest layer in atmosphere is called ..... , while the hottest layer is called .....
5. $2NaBr + Cl_2 \longrightarrow$ ..... + .....
6. The nuclear reactors cause ..... pollution for water.

**B Look at the opposite figure, then calculate :**



1. The atomic number of the element follows it in the same period.
2. The atomic number of the element follows it in the same group.

### Question 2

**A Choose the correct answer :**

1. Fossils are often formed in ..... rocks.
   a. metamorphic  b. sedimentary  c. igneous
2. From the extinct species is .....
   a. dodo bird.  b. lion.  c. panda.
3. ..... form positively charged ions when they enter in a chemical reaction
   a. Inert gases  b. Halogens  c. Alkali metals
4. The unit of measuring the degree of ozone is .....
   a. km.  b. litre.  c. dobson.
5. From the endangered species is .....
   a. bald eagle.  b. passenger pigeon.  c. tasmanian cat.
6. The device that is used for determining the elevation from sea level is .....
   a. aneroid.  b. altimeter.  c. thermometer.
7. Decreasing $CO_2$ gas percentage is caused by .....
   a. cutting trees.  b. cultivating trees.  c. burning fossils fuel.
8. All of the following elements are from semi-metals except .....
   a. silicon.  b. boron.  c. bromine.
9. The atmospheric pressure on the top of a mountain is ..... the atmospheric pressure at the sea level.
   a. more than  b. less than  c. equal to



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**B** **Calculate the temperature at the top of a mountain if you know that the temperature at its foot is 26°C and its height is 4 km.**

## Question 3

**A** **Write the scientific term :**

1. The continuous decrease in the number of a certain species of living organisms without compensation until the last member of the species dies out.
2. Shells in the atom structure indicated by the letters K, L, M, N, O
3. Appearance of bright coloured light curtains at the two poles.
4. The weight of air column of an atmospheric height on a unit area.
5. A charged layer which reflects radio waves.
6. The continuous increase in the average temperature of the Earth.

**B** **Locate the following element in their position in the modern periodic table :**

1. $_{20}Ca$ 2. $_{17}Cl$ 3. $_{3}Li$ 4. $_{7}N$

## Question 4

**A** **Give reasons for the following :**

1. Water molecule is a polar compound.
2. The lower part of stratosphere is suitable for flying planes.
3. Tropical forest is a complicated ecosystem.

**B** **Correct the underlined words :**

1. **Sodium** is used in making electronic slides.
2. Cobalt 60 is used in preservation of **cornea of eye**.
3. When water freezes, its **density** increases.
4. The ozone hole appears above the **middle east**.

# 13 Alexandria Governorate — Al-Gomrok Educational Zone

**Answer the following questions :**

## Question 1

**A** **Choose the correct answer :**

1. The temperature at the top of mesosphere layer reaches .....
   a. – 60°C b. – 90°C c. 0°C d. 120°C
2. The strongest metal locates in group .....
   a. 2A b. 1A c. 7A d. zero



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الصف الثانى الاعدادى موقع ذاكرولى التعليمى كتاب المعاصر

Part 3

3. ..... is an example of extinct species.

a. Panda bear b. Bald eagle c. Quagga d. Papyrus plant

4. If the atomic number of an element is 15, so the electronic configuration of its ion is .....

a. (2,8,8). b. (2,8). c. (5,8,5). d. (2,5,8).

5. The gas produced from the reaction between sodium bicarbonate and vinegar is .....

a. $CH_2$ b. $N_2O$ c. $H_2$ d. $CO_2$

**B What happens in the following cases ... ?**

1. Decrease in water temperature less than 4°C.
2. Storing tap water in plastic bottles of mineral water.

**C Locate the position of these elements in the modern periodic table :**

1. $_2He$ 2. $_{19}K$ 3. $_7N$

## Question 2

**A Write the scientific term :**

1. The continuous decrease in the number of species without compensation until all die out.
2. The hottest layer in the atmosphere.
3. The elements which have the properties of both metals and nonmetals.
4. They are safe areas established to protect the endangered species in their homeland.
5. The radioactive element that is used in food preservation.

**B Compare between :**

Mendeleev's periodic table and modern periodic table.

**C Mention one use or importance for the following :**

1. Hofmann's voltameter. 2. Liquefied nitrogen. 3. Van-Allen belts.

## Question 3

**A Complete the following statements :**

1. The fossils are found in ..... rocks.
2. Increasing the concentration of ..... in water causes the death of brain cells.
3. $Br_2 + 2KI \longrightarrow$ ..... + .....
4. The snow crystal has ..... shape.

**B If a mountain, its height is 6000 m and the temperature at its base is 30°C. Calculate the temperature at its top.**



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**C Mention one example for :**

1. An element doesn't react with water.
2. A type of microfossils which is considered a guide for existence of petroleum.
3. An endangered bird.

## Question 4

**A Correct the underlined words :**

1. **Methyl bromide** used in extinguishing fires.
2. The unit of measuring the degree of ozone layer is **bar**.
3. Ca and **Na** react slowly with water.
4. **Lithium** is the strongest metallic element in group (1A).
5. **$O_2$** is from greenhouse gases.

**B Give reasons for the following :**

1. Freon gas has bad effects on the environment.
2. By increasing the atomic number among groups, the atomic size increases.
3. Amber is considered a suitable medium for formation of complete body fossils.

**C Write the balanced chemical equations representing each of the following :**

1. Magnesium with hydrochloric acid.
2. Reaction of sodium with water.

# 14 El-Qalyoubia Governorate — Banha Educational Zone

**Answer the following questions :**

## Question 1

**A Choose the correct answer :**

1. All of the following elements are from semi-metals except .....
   a. tellurium. b. silicon. c. boron. d. bromine.
2. The strongest metal locates in group .....
   a. 2A b. 1A c. 1B d. 7A
3. Ozone layer doesn't allow the passage of ..... ultraviolet rays.
   a. near b. medium
   c. far d. all the previous answers
4. There are ..... bonds between water molecules.
   a. hydrogen b. covalent
   c. ionic d. all the previous answers



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كتاب المعاصر موقع ذاكرولى التعليمى الصف الثانى الاعدادى

Part 3

5. Fossils are found in .....rocks.
   a. igneous b. sedimentary
   c. metamorphic d. all the previous answers
6. All of thc following arc cndangcrcd spccics cxccpt .....
   a. panda bear. b. bald eagle. c. quagga. d. rhinoceros.

**B Give reasons for :**

1. Elements of the same group have similar properties.
2. The use of radioactive cobalt 60 in food preservation.
3. The infrared radiation cannot penetrate the Earth's atmosphere.
4. Establishing a gene bank for the endangered species.

**C Find the temperature at the top of a mountain, its height is 3 km, if the temperature at the sea level is 15°C. Is snow formed or not and why ?**

## Question 2

**A Write the scientific term :**

1. The continuous increase in the average temperature of the Earth's near-surface air.
2. Fossils used in determination of the age of rocks.
3. A charged layer which reflects radio waves.
4. The arrangement of metals in a descending order according to their chemical activity.
5. The ability of the atom in a covalent molecule to attract the electrons of the chemical bond towards itself.
6. It is the path of energy that transmits from a living organism to another in the ecosystem.

**B How can you differentiate chemically between each of the following ?**

1. Copper and zinc (by adding HCl). Write the balanced chemical equation.
2. Magnesium oxide and sulphur oxide.

**C Locate the position of the following elements in the modern periodic table :**

1. $_{20}Ca$ 2. $_{10}Ne$ 3. $_{17}Cl$ 4. $_{8}O$

## Question 3

**A Put (✓) or (✗) and correct the wrong ones :**

1. Water and ammonia are non-polar compounds. ( )
2. Liquefied sodium is used in preservation of cornea of the eye. ( )
3. The atomic size decreases in periods as the atomic number increases. ( )
4. Lacking of plants on the Earth leads to the increase in the temperature. ( )
5. Quagga is an extinct animal in the recent times. ( )



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**B Mention one importance or use for :**

1. Altimeter.
2. Foraminifera microfossil.
3. Silicon.
4. Mesosphere.

**C Complete the following equations :**

1. $CO_2 + H_2O \longrightarrow$ .....
2. $Br_2 + 2KI \longrightarrow$ ..... + .....
3. $2Na +$ ..... $\longrightarrow 2NaOH +$ ..... ↑
4. $2H_2O \xrightarrow{\text{electrolysis}}$ ..... ↑ + ..... ↑

## Question 4

**A Correct the underlined words :**

1. Elements in group (1A) are known as **halogens**.
2. **Mammoth** is one of the examples of petrified fossils.
3. Ozone degree is measured in **picometre** unit.
4. Each period ends with **a nonmetal**.

**B What happens when ... ?**

1. Putting lithium in kerosene.
2. Drinking water polluted with mercury.
3. Increasing the use of $CFC_s$ on Earth.
4. Mixing of animal and human wastes in water.

**C Compare between (related to definition and examples) :**

1. Simple ecosystem and complicated ecosystem.
2. Cast and mold.

# 15 El-Sharkia Governorate — West Zagazig Admin.

**Answer the following questions :**

## Question 1

**A Choose the correct answer :**

1. Elements of the modern periodic table are classified into ..... block(s).
   a. one  b. two  c. three  d. four
2. ..... is an atom of a non-metallic element which gains an electron or more during the chemical reaction.
   a. Positive ion  b. Negative ion
   c. Excited atom  d. No correct answer



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Part 3

3. All of the following are greenhouse gases except .....
a. $O_2$ b. $CO_2$ c. $N_2O$ d. $CH_4$

4. The ozone degree is measured by a unit called .....
a. km. b. $mm^2$ c. dobson. d. millibar.

**B Give reasons for :**

1. Sodium is kept under the surface of kerosene.
2. Ionosphere layer is important for radio stations.

**C What is meant by ... ?**

1. Water pollution.
2. Global warming phenomenon.

## Question 2

**A Put (✓) or (✗) and correct the wrong ones :**

1. Ferns fossils indicate that the environment where they lived was a sea floor. ( )
2. The boiling point of liquefied nitrogen is (– 196°C). ( )
3. Stratopause is the region between stratosphere and troposphere. ( )
4. Tropical forest is an example of complicated ecosystem. ( )

**B What is the importance of ... ? (give only one use)**

1. Cobalt 60
2. Fossils.

**C Locate the position of the following elements in the modern periodic table :**

1. $_{10}Ne$
2. $_{19}K$

## Question 3

**A Complete the following sentences :**

1. Mendeleev arranged the elements ascendingly according to ....., while Moseley arranged them ascendingly according to .....
2. Archaeopteryx is the link between ..... and .....
3. The highest temperature layer in the atmosphere is ..... and the least temperature one is .....
4. Group (1A) is called ..... , but group (7A) is called .....

**B Give one example for :**

1. An extinct bird.
2. A polar compound.
3. Severe climatic changes.
4. An endangered plant.

**C What happens when ... ?**

The absence of one type of species from the simple ecosystem.



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## Question 4

**A Write the scientific term :**

1. The solidified resinous matter which was secreted by pine trees during old geologic ages.
2. The bond between water molecules.
3. A gas which is important for building ozone gas.
4. A phenomenon that appears as brightly coloured light curtains seen at the both poles of the Earth.

**B Compare between :**

1. Trace and remains.
2. Troposphere and stratosphere.

**C Write the chemical equation which represents the following reactions :**

1. Magnesium with dilute hydrochloric acid.
2. Carbon dioxide with water.

# 16 El-Menofia Governorate — Shebin El-Kom Directorate

**Answer the following questions :**

## Question 1

**A Complete the following sentences :**

1. In the periodic table, the elements which are identical in properties lie in the same .....
2. Mendeleev had to deal with the ..... of one element as different elements, because they are different in their .....
3. d-block contains ..... elements.
4. $2Na + 2H_2O \longrightarrow$ ..... + .....
5. Among the most famous types of barometers are ..... and .....
6. Types of fossils differ according to their way of .....
7. The snow crystal's shape is ..... and its density is ..... than water density.

**B Locate the position of the following elements in the modern periodic table :**

1. $_{1}H$
2. $_{10}Ne$
3. $_{20}Ca$

## Question 2

**A Write the scientific term :**

1. They are the elements which have the properties of both metals and nonmetals.
2. A table in which the elements are arranged according to their atomic numbers.
3. It is the curved lines that join the points of equal pressure in atmospheric pressure maps.
4. Safe places are specialized for protecting endangered species in their homeland.



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Part 3

**B Give reasons for :**

1. Cesium (Cs) is considered one of the strongest metallic elements.
2. Mesosphere layer is highly rarefied (vacuumed).
3. Petrified woods are considered from fossils although they look like rocks.

**C Complete the following equation :**

$Br_2 + 2KI \longrightarrow$ ..... + .....

## Question 3

**A Put (✓) or (✗) and correct the wrong ones :**

1. The solutions produced from dissolving the nonmetal oxides in water, turn the violet litmus solution into red. ( )
2. Copper (Cu) and silver (Ag) react very slowly with cold water. ( )
3. Bohr had discovered the main energy levels. ( )
4. Ferns fossils indicate that the environment where they lived was a sea floor. ( )

**B Compare between the following :**

1. Chlorine and bromine. (according to : the physical state and chemical activity)
2. Simple ecosystem and complicated ecosystem. (according to : definition and examples)

**C Arrange the following elements in a descending order according to the metallic property ? Why ?** ($_{11}Na - _{12}Mg - _{19}K$)

**D Calculate the height of a mountain if the temperature at its foot is 30°C and at its top is (– 9°C).**

## Question 4

**A What is meant by each of the following ... ?**

1. Global warming phenomenon.
2. Trace.
3. The degree of ozone above an area is 300 dobson.

**B Mention one example for :**

1. Element used in food preservation.
2. Mold.
3. Cast.

**C What happens in the following situations ... ?**

1. Putting a hot water container in the freezer and close the fridge.
2. Dipping of old insects in resinous matter and the matter solidifies.
3. Mixing of animal and human wastes with water.



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## 17 El-Dakahlia Governorate — Educational Directorate

**Answer the following questions :**

### Question 1

**A Using the following diagram which represents a part of the periodic table, answer the following questions :**

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $_1H$ | | | | | | | | | | | | | | | | | $_2He$ |
| 3 | X | | | | | | | | | | | 5 | 6 | Y | 8 | 9 | 10 |
| 11 | 12 | | | | | | | | | | | | | | Z | 17 | G |
| 19 | M | | | | N | | | | | | | | | | | 35 | $_{36}Kr$ |

1. **Write the letter(s) of the element(s) which is/are :**
   (1) among transition elements.
   (2) located in period (3) and group (6A).
   (3) among noble gases.
   (4) considered among s-block.
   (5) considered among p-block.
2. **Choose :**
   (1) The letter (Y) represents ..... element.
   a. $_9F$ b. $_8O$ c. $_{12}Mg$ d. $_7N$
   (2) The letter (M) represents ..... element.
   a. $_{12}Mg$ b. $_{16}S$ c. $_{20}Ca$ d. $_{18}Ar$
   (3) The letter (N) is located in ..... block.
   a. s b. p c. d d. f
3. **What is the atomic number of the elements (N) and (G) ?**

**B Problem :**

If the temperature at sea level is 24.5°C, find the temperature at the top of troposphere layer if its thickness is 13 kilometre.

### Question 2

**A Choose the correct answer :**

1. The properties of the element which has atomic number equals 17 are similar to the element which has atomic number equals .....
   a. 7 b. 9 c. 15 d. 20
2. ..... is the lowest metallic element is group (1A).
   a. Na b. Cs c. K d. Li



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3. The oxide which dissolves in water and produces an acid is .....
   a. MgO  b. FeO  c. CuO  d. $CO_2$
4. The gas which is evolved on reacting alkali metals with water is .....
   a. oxygen.  b. nitrogen.  c. hydrogen.  d. helium.
5. The volume of hydrogen gas evolving from water electrolysis is ..... the volume of oxygen gas.
   a. equal to  b. twice  c. half  d. four times
6. One dobson unit is defined as .....
   a. 3 mm.  b. 0.1 mm.  c. 0.01 mm.  d. 2 mm.

**B "Ozone layer is found in the stratosphere layer, it's important to protect the life of organisms"**

1. What is the average thickness of ozone layer in atmosphere ?
2. What is the only element that forms ozone gas ?
3. Complete :
   a. Ozone layer protects the Earth from the harmful effects of ..... radiation.
   b. The thickness of ozone layer at STP is .....
4. Put (✓) or (✗) :

   Ozone layer prevents penetration of all types of UV radiation. (  )

## Question 3

**A Give reason for each of the following :**

1. Mammoth fossil is preserved as a complete body fossil.
2. Naming the bald eagle by this name.
3. Water molecule is from polar compounds.
4. The global warming phenomenon has negative effects on Earth.

**B Arrange the following fossils starting with first appearance on the life stage with explanation :**

(Cast fossil of fish – Mammoth fossil – Trilobite fossil – Archaeopteryx fossil)

## Question 4

**A Write the scientific term of each of the following :**

1. The continuous decrease in the number of a certain species of living organisms, without compensation until they all die out.
2. A group of food chains connected with each other.
3. The environmental system that is not affected severely by the absence of one species of living organisms that live in it.



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4. An aquatic plant used by pharaohs to manufacture writing papers.
5. Traces and remains of old living organisms that are preserved in the sedimentary rocks.
6. Safe places that are specified to protect the endangered species in their homeland.

**B Calculate :**

The percentage of erosion of ozone layer in a certain area, knowing that ozone degree at this area is 255 dobson.

## 18 Ismailia Governorate — Educational Directorate

**Answer the following questions :**

### Question 1

**A Choose the correct answer :**

1. Elements of group (7A) are known as .....
   a. inert gases. b. alkali metals.
   c. halogens. d. alkaline Earth metals.
2. Meteors are burnt in ..... layer.
   a. ionosphere b. stratosphere c. mesosphere d. thermosphere
3. Elements of the same period in the modern periodic table have the same .....
   a. number of energy levels. b. atomic number.
   c. number of electrons in the outermost energy level. d. valency.
4. ..... protectorate is the first one established in Egypt.
   a. Ras Mohamed b. Wadi Hetan c. Saint Cathrine d. Petrified forest
5. Metal oxides are ..... oxides.
   a. acidic b. basic c. both of them d. no correct answer
6. All of the following are greenhouse gases except .....
   a. $CO_2$ b. $O_2$ c. $N_2O$ d. $CH_4$
7. Fossils are preserved in ..... rocks.
   a. sedimentary b. igneous c. metamorphic d. no correct answer
8. There are ..... bonds between water molecules.
   a. ionic b. covalent c. hydrogen d. metallic

**B Give reasons for the following :**

1. The lower part of stratosphere is suitable for flying aeroplanes.
2. Simple ecosystem is affected strongly by the absence of one of its species.
3. The atomic size increases by increasing the atomic number within the same group in the modern periodic table.
4. Stopping producing concorde aeroplanes.

**C Mention one use for the following elements :**

1. Radioactive cobalt 60.
2. Liquefied nitrogen.



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## Question 2

**A Correct the underlined words :**

1. The ozone layer is found in **thermosphere** layer.
2. Ferns fossils indicate that the environment where they lived was **a sea floor**.
3. $Mg + 2HCl \xrightarrow{dil.} \underline{Mg + Cl_2}$
4. **Aneroid** is an instrument used to determine the elevation of aeroplanes above sea level.
5. Ice crystals have **round** shape and large volume.
6. **Copper** reacts instantly with water and hydrogen gas evolves.
7. Elements of **p-block** are organized in two groups.

**B What happens when... ?**

1. Ascending up in troposphere (concerning : temperature and atmospheric pressure).
2. Existence of ozone in conditions of standard temperature and pressure (STP).

**C If the temperature at the base of a mountain = 30°C and its height = 2000 m, Find the temperature at its top.**

**D Mention three ways to protect living organisms from extinction.**

## Question 3

**A Complete the following sentences :**

1. Most of weather phenomena happen in ..... layer.
2. Transition elements start to appear from period number ..... in the modern periodic table.
3. Archaeopteryx is the link between birds and .....
4. The ozone layer doesn't allow the penetration of all ..... ultraviolet rays.
5. ..... is an example of polar compounds.
6. Increasing of mercury concentration in drinking water causes .....
7. Fluorine and chlorine exist in ..... state.
8. ..... is from the negative effects of global warming phenomenon.

**B Locate the position of the following elements in the modern periodic table :**

1. $_{20}Ca$
2. $_{18}Ar$

**C Mention one example for each of the following :**

1. Fossils are found in El-Mokattam mountain.
2. One element from alkali metals.
3. An endangered bird.
4. A metalloid element.



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## Question 4

**A Write the scientific term of each of the following :**

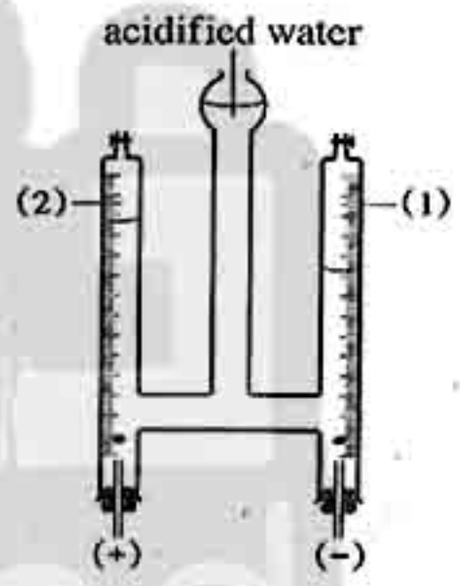
1. A charged layer reflects radio waves.
2. A kind of water pollution, which causes many diseases as typhoid.
3. The ability of the atom in a covalent molecule to attract the electrons of the chemical bond towards itself.
4. Replacing part by part, the wood material of the trees by silica to form petrified fossils.
5. The continuous increase in the temperature of the Earth's near-surface air.
6. The region between stratosphere and mesosphere at which the temperature remains constant.
7. A famous extinct animal in ancient periods.

**B Choose the odd word out :**

1. ${}_{2}He$ / ${}_{10}Ne$ / ${}_{18}Ar$ / ${}_{11}Na$
2. Dodo bird / Quagga / Papyrus plant / Mammoth.
3. Cast / Fossil of a complete body / Fossil record / Petrified fossils.

**C Examine the opposite figure, then answer :**

1. What is the name of this device ?
2. Label the numbers (1) and (2) ?
3. Write down the balanced symbolic equation which represents the reaction.




## 19 Damietta Governorate — Damietta Educational Directorate

**Answer the following questions :**

## Question 1

**A Complete the following sentences :**

1. The atomic size is measured by ....., but the atmospheric pressure is measured by .....
2. The ultraviolet radiation has a ..... effect and the infrared radiation has a ..... effect.
3. Eating fish which contains high concentration of lead causes ..... , but drinking water which contains high concentration of mercury leads to .....
4. The highest temperature layer in the atmosphere is ..... and the least temperature one is .....
5. Basic oxides are ..... oxides and their solutions turn the litmus solution into .....



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Part 3

**B Mention the importance of each of the following :**

1. Ozone layer.
2. Hofmann's voltameter.
3. Cobalt 60

**C Locate the position of the following elements in the modern periodic table : (With drawing)**

1. $_{17}Cl$
2. $_{20}Ca$
3. $_{10}Ne$

## Question 2

**A Write the scientific term of the following :**

1. The ability of the atom in a covalent molecule to attract the electrons of the chemical bond towards itself.
2. The halogen which exists in a liquid state.
3. The death of all members of certain species of living organisms.
4. A type of ultraviolet radiations that penetrates the ozone layer by a percentage 100%
5. Safe places established to protect endangered species in their natural environment.
6. The weight of air column of an atmospheric height above a unit area.

**B Mention one example for each of the following :**

1. An endangered bird.
2. A complete body fossil.
3. A metalloid element.
4. An extinct bird.
5. A polar compound.

**C Calculate the height of a mountain if the temperature at its foot is (30°C) and at its top is (– 6°C).**

## Question 3

**A Choose the correct answer :**

1. The degree ozone layer is measured by a unit called .....
   a. km. b. dobson. c. nanometre. d. $mm^3$
2. Fossils are often found in ..... rocks.
   a. metamorphic b. volcanic c. sedimentary d. igneous
3. The coldest atmospheric layer is .....
   a. troposphere. b. stratosphere. c. mesosphere. d. thermosphere.
4. The ..... form positive ions during chemical reactions.
   a. noble gases b. nonmetals c. alkali metals d. halogens
5. ..... react very instantly with water and hydrogen gas evolves.
   a. K and Na b. Cu and Ag c. Zn and Fe d. Ca and Mg

**B Write the balanced chemical equations which express the following reactions :**

1. Magnesium with dil. hydrochloric acid.
2. Sodium with water.
3. Bromine with potassium iodide.



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**C Mention the harms of :**

1. Storing water in plastic bottles of mineral water.
2. Melting the polar ice.
3. Overuse of freon.

## Question 4

**A Give reasons for :**

1. The lower part of stratosphere is suitable for flying aeroplanes.
2. Petrified woods are considered from fossils although they look like rocks.
3. Dissolving of sugar in water although it is among covalent compounds.
4. Occurrence of aurora phenomenon.

**B What is meant by ... ?**

1. Fossils.
2. Chemical activity series.
3. Greenhouse effect.

**C Correct the underlined words :**

1. Elements of d-block contain **lanthanides**.
2. **Quagga** is the most famous extinct animal in the old times.
3. Meteors burn in **thermosphere** layer.

# 20 Kafr El-Sheikh Governorate — Educational Directorate

**Answer the following questions :**

## Question 1

**A Choose the correct answer :**

1. ..... is a polar compound.
   a. Petrol  b. Water  c. Alcohol
2. The main energy levels discovered by Bohr in the atom are .....
   a. 7  b. 5  c. 3
3. The first layer in the atmospheric envelope above the sea level is .....
   a. mesosphere.  b. stratosphere.  c. troposphere.
4. Mammoth was preserved in .....
   a. resinous matter.  b. snow.  c. mud sediments.

**B Write the scientific term of each of the following :**

1. One of components of the atmosphere that its percentage increased in recent years causing the greenhouse phenomenon.



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2. Safe places established to protect endangered species in the natural places.

3. A table in which the elements are arranged according to their atomic numbers and the way of filling the energy sublevels with electrons.

## Question 2

**A Give reason for each of the following :**

1. Petrified woods are considered from fossils although they look like rocks.
2. The atomic size increases in the same group by increasing the atomic number.
3. Governments put laws for regulating the process of hunting of some living organisms.
4. Halogens don't exist individually in nature, but they exist in chemical compounds.

**B Give a brief definition for each of the following :**

1. Chemical activity series.
2. Exosphere.
3. Fossils.

## Question 3

**A Mention the effects resulting from the following :**

1. Putting in the freezer of the fridge a closed bottle completely filled with water.
2. Extinction of one species or more from a simple balanced ecosystem.
3. Sediments fill a snail shell cavities, then later it solidifies and the shell is removed.
4. On going above sea level.

**B Put (✓) in front of the right statements and (✗) in front of the wrong statements :**

1. Nonmetal oxides dissolve in water forming acidic solutions. ( )
2. Meteors burn in the mesosphere. ( )
3. Silicon slides are good conductors of electricity. ( )

## Question 4

**A Illustrate with chemical equations only the reactions of the following :**

1. The formation of ozone by the effect of ultraviolet radiation.
2. Forming a salt of an acid when dilute acid is added to a metal.
3. Decomposition of acidified water by electricity into two elements hydrogen and oxygen.

**B Complete the following statements :**

1. ..... is the layer in the atmospheric envelope which contains most of the ozone which is located between 20 to ..... km above sea level.
2. Alkali metals are good conductors of ..... and .....



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## 21 El-Behiera Governorate — Bani El-Delengate Official School

**Answer the following questions :**

### Question 1

**A Choose the correct answer :**

1. Satellites orbit in ..... layer.
   a. stratosphere  b. exosphere  c. mesosphere  d. thermosphere
2. Ozone degree is measured by a unit called .....
   a. km.  b. millibar.  c. dobson.  d. nanometre.
3. Which of the following fossils indicates that the environment, where they lived was a hot and rainy tropical environment ? .....
   a. Nummulites fossils.  b. Ferns fossils.
   c. Coral fossils.  d. Archaeopteryx fossils.
4. All of the following are ozone pollutants except .....
   a. methyl bromide gas.  b. $CO_2$  c. halons.  d. $CFC_s$

**B Mention the harms of :**

1. Drinking water contains high concentration of mercury.
2. Global warming phenomenon. (one harm)

**C Mention one use for each of the following :**

1. Liquefied nitrogen.  2. Coral fossils.  3. Van-Allen belts.

### Question 2

**A From the following diagram which represents a part of the periodic table, answer the following questions :**

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | |
| E | | | | | | | | | | | | D | | | G | | |
| A | B | | | | | | | | | | | | L | | R | H | |
| C | | | | | N | | | | | | | | | | | | |

**[NB. The letters in the table don't represent the actual symbols of the elements]**

1. Arrange the elements B, A, R, L descendingly according to the atomic size.
2. Complete the following :
   The shaded part represents ..... elements.
3. Write the letter(s) of the element(s) which :
   (a) Belong(s) to d-block.  (b) is/are from inert gases.
   (c) Belong(s) to alkali metals.



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**B Write the scientific term of each of the following :**

1. It is a series in which metals are arranged in a descending order according to their chemical activity.
2. It is addition of any substance to the water which causes continuous gradual change in water properties affecting the health and the life of living creatures.
3. A type of ultraviolet radiations that is absorbed (95%) by the ozone layer.
4. It is the continuous decrease without compensation in the number of certain species of living organisms until all members of species die out.
5. It is the solidified resinous matter which was secreted by pine trees in old geologic ages.

**C Compare between each of the following :**

1. Sodium ($_{11}Na$) and calcium ($_{20}Ca$).
   (According to : the position in the modern periodic table and the reaction with water)
2. Remains and mold. (according to : definition and example).

## Question 3

**A Complete the following sentences :**

1. The height of atmospheric envelope above sea level is .....km, while the normal atmospheric pressure equals ..... millibar.
2. $CO_2 + H_2O \longrightarrow$ .....
3. $Br_2 + 2KI \longrightarrow$ ..... + .....
4. Moseley arranged the elements ascendingly according to ..... , while Mendeleev arranged the elements ascendingly according to .....
5. The crystal of ice has ..... shape.

**B Choose the odd word out, and find the relation between the others :**

1. $_9F$ / $_6C$ / $_{35}Br$ / $_{17}Cl$
2. Dodo bird / Ibis bird / Bald eagle / Panda bear.

## Question 4

**A Correct the underlined words in the following statements :**

1. **Ammonites** fossils are found in limestone rocks which form El-Mokattam mountain.
2. Infrared radiation has a **chemical** effect.
3. Hofmann's voltameter used in **thermal analysis** of acidified water.

**B Calculate the temperature at the top of a mountain, which its height is 4 km. If the temperature at the base of that mountain is 24°C.**

**C Give reasons for :**

1. Water has high boiling point.
2. Magnesium oxide is a basic oxide.
3. Ozone layer is formed in stratosphere.
4. Complicated ecosystem is not affected much by the absence of one of its species.



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## 22 El-Fayoum Governorate — Educational Directorate

**Answer the following questions :**

### Question 1

**A Complete the following statements :**

1. Mendeleev arranged the elements ascendingly according to ..... , while Moseley arranged them ascendingly according to .....
2. The highest temperature layer in the atmosphere is ..... and the least temperature one is .....
3. Dodo bird is ..... bird, while bald eagle is ..... bird.
4. The scientist ..... discovered the main energy levels in the atom.
5. There are ..... bonds between water molecules.

**B What is meant by ... ?**

1. Fossils. 2. Semi-metals. 3. Atmospheric pressure.

**C Locate the position of the following elements in the modern periodic table :**

1. $_{10}Ne$ 2. $_{19}K$

### Question 2

**A Correct the underlined words in the following statements :**

1. Transition elements start to appear in the **first** period.
2. Increasing $O_2$ concentration in the atmosphere produces the global warming phenomenon.
3. Meteors burn in **stratosphere**.
4. **Mammoth** is an example of microfossils.
5. Sodium oxide is from **acidic** oxides.
6. **Wadi El-Hetan** protectorate is the first established natural protectorate in Egypt.

**B What is the importance of ... ?**

1. Ozone layer. 2. Index fossils. 3. Cobalt 60

**C Mention one difference between :** Cast and mold.

### Question 3

**A Write the scientific term of each of the following statements :**

1. The ability of the atom in a covalent molecule to attract the electrons of the chemical bond towards itself.



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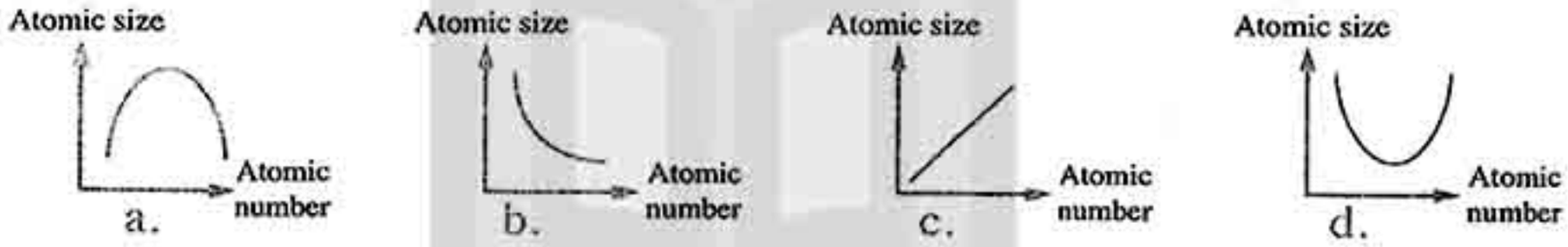
الصف الثانى الاعدادى موقع ذاكرولى التعليمى كتاب المعاصر

Part 3

2. A type of water pollution is originated from discharging of factories wastes and sewage in canals, rivers and seas.
3. The continuous decrease in numbers of species members without compensation until they all dic out.
4. Metals are arranged descendingly according to their chemical activity.
5. A charged layer reflects radio waves.

**(B) Choose the correct answer :**

1. ..... is located between stratosphere and mesosphere.
   a. Tropopause b. Stratopause c. Mesopause d. Thermopause
2. Graph ..... represents the graduation of the atomic size in the third period.




3. ..... is one of the most important causes of extinction in the recent ages.
   a. Volcanic eruption b. Falling of icebergs
   c. Falling of meteorites d. Overhunting and environmental pollution
4. Fossils are often found in ..... rocks.
   a. metamorphic b. sedimentary c. volcanic d. igneous
5. All of the following are from the properties of water except .....
   a. it has a neutral effect on both of litmus papers.
   b. it is a polar compound.
   c. its volume increases by freezing. d. it decomposes by heat into its elements.

**(C) What are the results of ... ?**

1. Sodium isn't kept under kerosene or paraffin.
2. Storing water in plastic bottles of mineral water.

## Question 4

**(A) Give reasons for :**

1. Van-Allen belts play an important role in atmosphere.
2. Although sugar is a covalent compound, it dissolves in water.
3. Petrified woods are considered from fossils although they look like rocks.

**(B) Write the balanced chemical equations which express the following reactions :**

1. The reaction between bromine and potassium iodide.
2. Magnesium with dil. hydrochloric acid.



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**C** **Calculate the height of a mountain if the temperature at its foot is 20°C and at its top is (– 6°C).**

**D** **Study the following figure which represents a section of the periodic table, then answer :**

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | | | | | I | K | | L | | N |
| | C | | | | | | | | | | H | | | | | | O |
| B | | | | D | | | E | | F | | G | | J | | | M | |

**[NB. The letters in the table don't represent the actual symbols of the elements]**

**Write the symbol(s) which indicate(s) :**

a. Halogens.

b. Inert gases.

c. The most active metal.

d. Transition elements.

## 23 El-Menia Governorate — St. Mark and El-Tawfik School

**Answer the following questions :**

### Question 1

**A** **Choose the correct answer :**

1. The scientist ..... had discovered the main energy levels.
   a. Moseley  b. Bohr  c. Hofmann  d. Mendeleev
2. The atomic number of an element that exists in group (7A) and period (2) is .....
   a. 12  b. 7  c. 9  d. 17
3. Each period in the periodic table starts with a/an .....
   a. metal.  b. metalloid.  c. nonmetal.  d. inert gas.
4. ..... is considered from halogens.
   a. Sodium  b. Chlorine  c. Helium  d. Calcium
5. Ozone layer is found in ..... layer.
   a. troposphere  b. stratosphere  c. mesosphere  d. thermosphere

**B** **Write the balanced chemical equations that illustrate the following reactions :**

1. Reaction of sodium with water.
2. Reaction of magnesium with dilute hydrochloric acid.
3. Reaction of carbon dioxide gas with water.
4. Reaction of chlorine gas with potassium bromide solution.



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Part 3

## Question 2

**A Write the scientific term of each of the following :**

1. The ability of the atom in a covalent molecule to attract the electrons of the chemical bond towards itself.
2. The apparatus which is used in water electrolysis.
3. The weight of air column of an atmospheric height on a unit area.
4. A unit used for measuring ozone degree.
5. The death of all members of species of living organisms.

**B Problem :** Calculate the height of a mountain if the temperature at its base is (30°C) and at its top is (– 9°C).

## Question 3

**A Complete the following statements :**

1. The modern periodic table consists of ..... horizontal periods and ..... vertical groups.
2. By increasing the atomic number in groups, the atomic size ..... due to the increase in the number of .....
3. ..... and ..... are examples of polar compounds.
4. The valency of alkali metal elements is .....
5. Mixing animal and human wastes with water causes ..... water pollution, while dumping atomic wastes in oceans causes ..... water pollution.
6. The highest temperature layer in the atmosphere is ..... and the lowest temperature layer in the atmosphere is .....
7. ..... and ..... are endangered species.

**B What's the importance of ... ?**

1. Van-Allen belts. 2. Ozone layer. 3. Cobalt 60

**C Give reasons for the following :**

1. The lower part of stratosphere is suitable for flying aeroplanes.
2. Liquefied nitrogen is used in preservation of the eye cornea.

## Question 4

**A Choose from column (B) what suits it in column (A) :**

| (A) Harms | (B) Pollutant |
|---|---|
| 1. Death of brain cells.<br>2. Liver cancer.<br>3. Blindness. | a. lead.<br>b. sodium.<br>c. mercury.<br>d. arsenic. |



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**B What's meant by each of the following ... ?**

1. Fossils.
2. Metalloids.
3. Aurora phenomenon.

**C What will happen in each of the following cases ... ?**

1. Storing water in plastic bottles of mineral water.
2. The overuse of freon.

## 24 Sohag Governorate — Educational Directorate

**Answer the following questions :**

### Question 1

**A Complete the following statements :**

1. The modern periodic table consists of ..... periods and the period number represents the number of .....
2. Pure water boils at ..... and freezes at .....
3. Most weather phenomena occur in ..... layer, while satellites swim through the .....
4. From the reasons of recent extinction are ..... and .....

**B Mention one difference between :**

1. Acidic oxide and basic oxide (dissolving in water).
2. Simple ecosystem and complicated ecosystem (example only).

**C If the temperature at the sea level is 20.6°C. Find the temperature at the top of a mountain of height 2 km above Earth's surface.**

### Question 2

**A Give reasons for :**

1. Cobalt 60 is used in food preservation.
2. Petrified woods are considered as fossils although they look like rocks.
3. Elements of the same group have similar properties.

**B What happens when ... ?**

1. The overuse of freon.
2. Adding dil. HCl to a piece of carbon.
3. Decrease of water temperature less than 4°C.

**C Mention the importance of :**

1. Van-Allen belts.
2. Altimeter.



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Part 3

## Question 3

**A Choose the correct answer :**

1. The scientist who discovered the main energy levels is .....
   a. Mendeleev. b. Bohr. c. Rutherford.
2. Complete body fossils of insects are found preserved in .....
   a. amber. b. snow. c. ocean.
3. All of the following gases are greenhouse gases except .....
   a. $CO_2$ b. $O_2$ c. $CH_4$
4. The density of ice is ..... the density of water.
   a. less than b. more than c. equal to
5. ..... is considered from halogens.
   a. Sodium b. Chlorine c. Helium
6. The normal atmospheric pressure at the sea level equals ..... millibar.
   a. 1013.25 b. 76 c. 1.013

**B Write the chemical equations which represent the following reactions :**

1. Reaction of sodium with water.
2. Reaction between chlorine gas and potassium bromide.
3. Carbon dioxide with water.

**C Calculate the atomic number of :**

1. Element (X) is located in the 3rd period and group (2A).
2. Element (Y) is located in the 1st period and group (1A).

## Question 4

**A Write the scientific term :**

1. Elements have the properties of metals and nonmetals.
2. A charged layer reflects radio waves.
3. A bond that exists between water molecules.
4. A unit used for measuring ozone degree.
5. An apparatus used in electrolysis of water.
6. Safe areas established to protect endangered species.

**B Correct the underlined words :**

1. **Fluorine** is the only liquid halogen.
2. **Chemical** pollution of water causes many diseases as typhoid and hepatitis.
3. Meteors burn in **stratosphere**.
4. Archaeopteryx links between reptiles and **mammals**.
5. **Sodium chloride** is from polar compounds.

**C Locate the position of the following elements in the modern periodic table :**

1. $_{10}Ne$ 2. $_{19}K$ 3. $_{16}S$



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## 25 Qena Governorate — Educational Zone

**Answer the following questions :**

### Question 1

**A Complete the following statements :**

1. In the modern periodic table, the elements are arranged according to ..... and .....
2. The strongest metallic element is found in group .....
3. The thickness of mesosphere layer is about ..... km.
4. ..... and ..... are considered from ozone layer pollutants.
5. The normal atmospheric pressure at the sea level equals ..... mb.
6. Fossils always exist in the ..... rocks.

**B Write a definition for the following :**

1. Extinction.
2. Electronegativity.
3. Atmospheric pressure.

### Question 2

**A Choose the correct answer :**

1. Which of the following fossils play an important role in petroleum exploration ? .....
   a. Foraminifera and radiolaria. b. Nummulites and ammonites.
   c. Foraminifera and trilobite.
2. The ..... is/are used in preservation of agricultural crops.
   a. methyl bromide gas b. halons c. nitrogen oxide
3. The coldest atmospheric layer is .....
   a. troposphere. b. thermosphere. c. mesosphere.
4. The elements of group (7A) are known as .....
   a. alkali metals. b. halogens. c. alkaline earth metals.
5. There is ..... bonds between water molecules.
   a. ionic b. hydrogen c. covalent
6. Metal oxides are ..... oxides.
   a. acidic b. basic c. amphoteric
7. Which of the following fossils indicates that the environment, where they lived was clear warm and shallow seas ? .....
   a. Nummulites fossils. b. Ferns fossils. c. Coral fossils.



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Part 3

**B Give a reason for :**

1. Occurrence of extinction in the recent ages.
2. Sodium is kept under the surface of kerosene.

## Question 3

**A Write the scientific term :**

1. The horizontal rows in the modern periodic table.
2. The radioactive element which is used in food preservation.
3. The decrease in the thickness of ozone layer.
4. The separating region between troposphere and stratosphere.
5. The gas which is collected at the cathode in water electrolysis.
6. The semi-conductor element which is used in electronics industry.

**B Locate the position of the following elements in the modern periodic table :**

1. $_{20}Ca$ 2. $_{17}Cl$ 3. $_{5}B$ 4. $_{18}Ar$

## Question 4

**A Put (✓) or (✗) in front of the following :**

1. The air moves vertically in the bottom part of the stratosphere. ( )
2. Alkali metals locate in group (2A). ( )
3. Ice crystals have pentagonal shapes. ( )
4. In the period as the atomic number increases, the atomic size increases. ( )
5. The index fossil indicates the age of the sedimentary rocks. ( )
6. The simple ecosystem affected strongly by the absence of one species from its members . ( )

**B Compare between :**

The stratosphere layer and the mesosphere layer (in view of pressure and temperature).



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2
PART

# 30 Final Exams of some Schools Governorates

## 2018



* Some exams questions have been modified according to the ministry modifications for the first term 2017 - 2018

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PART 2

## 1 Cairo Governorate

New Cairo Educational Zone
Manor House School

**Answer the following questions :**

### Question 1

**A Complete the following :**

1. ..... is an example for metalloids.
2. ..... is from the recent extinct animals.
3. ..... are curved lines that join parts of equal atmospheric pressure.

**B Write the scientific term :**

1. The nonmetal element which is used in preservation of eye cornea.
2. The hottest layer in the atmospheric air.

**C What is the thickness of troposphere layer ? if the temperature at sea level is 24.5° C Find the temperature at the highest point.**

### Question 2

**A Choose the correct answer :**

1. The atmospheric pressure is measured in ..... unit.
   a. millibar  b. Dobson  c. nanometer
2. Meteors are formed in .....
   a. mesosphere.  b. stratosphere.  c. troposphere.

**B Give reasons for :**

The atomic size of elements in the same period decreases as their atomic number increases.

**C Correct the underlined words :**

1. Ozone gas is found in **troposphere** layer.
2. Quagga is from **endangered** species.
3. Inert gases are **active** gases.

### Question 3

**A What is meant by ... ?**

1. Polar compounds.  2. Water pollution.  3. Protectorates.

**B Compare between :**

• Troposphere and stratosphere layers.



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**C Complete the following equations :**

1. $Mg + 2HCl(dil.) \longrightarrow$ ..... + .....
2. $Br_2 + 2KI \longrightarrow$ ..... + .....
3. $MgO + H_2O \longrightarrow$ .....

## Question 4

**A What happens when ... ?**

1. The ratio of mercury increases in water.
2. Hydrogen molecule combines with oxygen atom.

**B What are the uses of ... ?**

1. Sodium in liquid state.
2. Aneroid.
3. Cobalt 60

**C Write the scientific term :**

1. A series in which metals are arranged in a descending order according to their chemical activity.
2. The apparatus which is used in water electrolysis.
3. A charged layer reflects radio waves.

## 2 Cairo Governorate — El Nozha Educational Administration, St. Fatima Lang. School

**Answer the following questions :**

## Question 1

**A Choose the correct answer :**

1. The scientist ..... had discovered the main energy levels.
   a. Moseley  b. Bohr  c. Hofmann  d. Moustafa
2. The modern periodic table consists of ..... horizontal periods.
   a. 7  b. 10  c. 14  d. 18
3. Atmospheric pressure is the ..... of air column of an atmospheric height on a unit area.
   a. mass  b. volume  c. weight  d. density
4. Ozone layer is found in ..... layer.
   a. troposphere  b. stratosphere  c. mesosphere  d. thermosphere
5. ..... is an example of microfossils.
   a. Mammoth  b. Ferns  c. Foraminifera  d. Archaeopteryx

**B Give reasons for :**

1. Sodium is kept under the surface of kerosene.
2. Liquefied nitrogen is used in preservation of cornea of the eye.
3. The continuity of ozone layer erosion.

**C What is meant by greenhouse gases ?**



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PART 2

## Question 2

**A** Put (✓) or (✗) and correct the wrong ones :

1. The elements with the same physical and chemical properties have been put in horizontal periods. ( )
2. Each period ends with a nonmetal. ( )
3. Papyrus is considered an extinct plant. ( )
4. Ultraviolet radiation splits the ozone molecule into two atoms. ( )
5. Mesosphere is the coldest layer in the atmospheric envelope. ( )

**B** Compare between the following :

- Mesosphere and thermosphere layers in term of (temperature and air pressure).

**C** What happens when ... ?

Putting red and blue litmus papers in pure water.

## Question 3

**A** Write the scientific term :

1. Elements which start to appear in fourth period.
2. They are indicated by the letters K, L, M, N, O, P and Q.
3. Elements which have the properties of metals and nonmetals.
4. A kind of rays that causes harmful effects to human.
5. Remains of old organisms that lived in the past for a certain period and then became extinct.

**B** Mention one difference between of the following :

1. Fluorine molecule and helium molecule.
2. Trace and remains.

**C** 1. Mention the negative effects of global warming phenomenon.

2. How do we keep water from pollution ?

## Question 4

**A** Complete the following statements :

1. Sodium oxide is from ..... oxides.
2. ..... and ..... are examples of polar compounds.
3. ..... radiation is characterized by a great heat effect.
4. Ozone layer contains a suitable amount of ..... gas.

**B** Show the electronic configuration of : $_{17}Cl$ and determine its location in the periodic table.

**C** Write the chemical equations :

1. Reaction of bromine with potassium.
2. Reaction of sodium with water.
3. Formation of ozone gas.

**D** Give a reason for : The boiling point of water is high.



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Workbook
Final Exams

## 3 Cairo Governorate — Heliopolis Educational Admin. St. Joseph's School

**Answer the following questions :**

### Question 1

**A Choose the correct answer :**

1. The number of electrons in the outermost energy level in $_{20}Ca$ is .....
   a. 1 b. 2 c. 3 d. 4
2. The number of period in $_{10}Ne$ atom is .....
   a. 1 b. 2 c. 3 d. 4

**B Give reason for each of the following :**

1. The simple ecosystem is severely affected by the absence of one type of species.
2. Halogens exist in chemical compounds and not individually in nature.

### Question 2

**A Write the scientific term :**

1. Elements that have both properties of metals and nonmetals.
2. A pollution originated from mixing of animals and human wastes with water.

**B What happens when ... ?**

- The concentration of greenhouse gases increases in the atmosphere.

### Question 3

**A Correct the underlined words :**

1. The distribution of the charged ions extends 700 kms above the sea level is known as the **troposphere**.
2. Basic oxides dissolve in water forming **acids**.

**B Write the proper group and period in the periodic table for each of the following :**

1. $_{19}K$ 2. $_{3}Li$ 3. $_{11}Na$ 4. $_{13}Al$

**C Define each of the following :**

1. Petrification.
2. Electronegativity.

### Question 4

**A Why is the radioactive Cobalt 60 used in food preservation ?**

**B Complete the following symbolic equations :**

1. ..... + $2HCl(dil.) \longrightarrow MgCl_2$ + .....
2. ..... + $2KI \longrightarrow 2KBr$ + .....

**C Explain each of the following :**

1. The Mammoth fossil was found to be completely preserved.
2. The density of water in its solid state is lower than in its liquid state.



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PART 2

## 4 Cairo Governorate

Heliopolis Educational Zone
St. Clare's College

**Answer the following questions :**

### Question 1

**A Complete the following sentences :**

1. Mendeleev arranged the elements according to ..... , while Moseley arranged the elements according to .....
2. There are ..... bonds between water molecules.
3. During the formation of ozone layer, oxygen molecule absorbs ..... , which breaks the bond between the two atoms.
4. Nonmetal oxide dissolves in water giving ..... , which turns litmus paper into .....
5. The highest temperature layer in the atmosphere is ..... and the least temperature one is .....

**B What is the importance of ... ?**

1. Hofmann's voltameter.
2. Van-Allen belts.
3. Altimeter.

**C Two elements $^{35}_{17}Y$ and $^{39}_{19}X$ , find :**

1. The electronic configuration.
2. The group number.
3. The period number.

### Question 2

**A Write the scientific term :**

1. Gradual decrease in the number of living organisms without compensation until all die out.
2. A liquid metal acts as a heat conductor in nuclear reactors for generating electricity.
3. The traces and remains of old living organisms which are preserved in the sedimentary rocks.
4. The ability of covalent molecule to attract electrons in chemical bond.
5. The elements that have both properties of metals and nonmetals.
6. A phenomenon due to increase the percentage of $CO_2$ gas and leads to increase the temperature of atmosphere.

**B Give reasons for :**

1. Sodium and potassium should be kept under kerosene.
2. Pilots prefer to fly their planes at the lower part of stratosphere layer.
3. The elements of the same group have similar properties.
4. Pure water doesn't affect litmus paper.



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**C What happens if ... ?**

1. Dissolving magnesium oxide in water (write the equation).
2. Increasing the ratio of nitrogen oxide in the atmosphere.
3. Drinking water polluted with mercury.

## Question 3

**A Choose the correct answer :**

1. All of the following metals react with water except .....
   a. potassium. b. copper. c. sodium. d. magnesium.
2. The unit of measuring atmospheric pressure is .....
   a. Dobson. b. bar. c. centimeter. d. kilogram.
3. Meteors are found in .....
   a. mesosphere. b. ionosphere. c. exosphere. d. stratosphere.
4. All of the following elements are Halogens except .....
   a. fluorine. b. nitrogen. c. bromine. d. chlorine.

**B What is meant by ... ?**

1. Atmospheric pressure.
2. Polar compounds.

**C Mention one example of :**

1. Greenhouse gases.
2. Basic oxides.
3. The strongest metallic element in group (1A).

## Question 4

**A Correct the underlined words :**

1. Each period ends with a **nonmetal**.
2. **Chemical** pollution of water causes many diseases as typhoid and hepatitis.
3. Infrared radiation has a **chemical** effect.
4. Panda bear is considered from **extinct species**.
5. Ozone layer is measured in a unit called **nanometer**.

**B Put (✓) or (✗) and correct the wrong statements :**

1. Ozone molecule consists of three hydrogen atoms. ( )
2. Halogens are monovalent metals. ( )
3. The density of air increases as we go up. ( )

**C Compare between :**

1. The metallic property in the group and in the period.
2. Simple ecosystem and complicated ecosystem. (definition only)



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PART 2

## 5 Cairo Governorate

Abdeen Educational Directorate
Virtue and Science

Answer the following questions :

### Question 1

**A Complete :**

1. Ionosphere is surrounded by two magnetic belts known as ..... belts that play an important role in .....
2. Among the pollutants of ozone layer are ..... compounds that are used in air conditioning sets and ..... compounds that are used in fire extinguishers.
3. ..... is an alkali metal which lies in period three and its atomic number is .....
4. The thickness of ozone layer is about ..... mm or equals ..... Dobson under STP.
5. Halogen molecules are ..... molecules as their molecules consist of ..... atoms.

**B State using equations :**

1. How to obtain $Br_2$ from KBr.
2. The role of UV radiation in ozone formation.

**C Explain :**

1. Hydrogen bond is responsible for the abnormal properties of water.
2. Importance of fossils in life evolution.

### Question 2

**A Give reasons for :**

1. Amber is considered a suitable medium for the formation of complete bodies' fossils.
2. Troposphere layer regulates the Earth's temperature.
3. Elements of the same group have similar properties.

**B Choose the correct answer :**

1. The number of negative electrons in the atom in its normal state equals .....
   a. the number of protons. b. the number of neutrons.
   c. twice the number of protons. d. half the number of neutrons.
2. Greenhouse effect explains .....
   a. erosion of the ozone layer. b. global warming.
   c. a new way of agriculture. d. water evaporation.
3. When sodium reacts with water, ..... gas evolves.
   a. $O_2$ b. $CO_2$ c. $H_2$ d. $N_2$

**C What does this number indicate 16 km ?**



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الصف الثانى الاعدادى موقع ذاكرولى التعليمى كتاب المعاصر

## Question 3

**A Write the scientific term :**

1. A phenomenon that appears as brightly colored light curtains seen from both the poles of the Earth.
2. Different forms of nuclei of the same element having the same atomic number but different in the atomic weights.
3. A kind of rays with wavelength 280 : 315 nm.

**B Compare between :**

1. The simple ecosystem and the complicated ecosystem.
2. Dodo bird and ibis bird.
3. Magnesium oxide and sulphur oxide.

**C Awareness about the importance of protecting natural life increased after great harmful consequences that have appeared since the mid $20^{th}$ century. Explain three ways to protect the endangered species.**

## Question 4

**A Correct without changing the underlined phrases :**

1. By increasing the atomic number within a period the **metallic property increases**.
2. Liquefied nitrogen is used in **food preservation**.

**B Mention one example for :**

1. A petrified fossil.
2. A natural protectorate found in South Sinai in Egypt.
3. An alkali metal that is kept under the surface of paraffin oil only.

**C What happens when ... ?**

1. Adding the purple sunflower solution to a jar has a piece of burning coal.
2. Dissolving potassium in water.
3. The pollution of water with animals and human wastes.

# 6 Cairo Governorate

El Maadi Educational Department
Manarat El Maadi Language School

**Answer the following questions :**

## Question 1

**A Write the scientific term :**

1. The weak electrostatic attraction between water molecules.
2. The ability of the atom in covalent molecule to attract the chemical bond electrons to it.
3. The vertical column in Mendeleev's table.
4. The traces and remains of old living organisms which are preserved in sedimentary rocks.
5. The hottest atmospheric layer.
6. A unit used for measuring ozone degree.



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PART 2

**B Give an example for :**

1. A metalloid.
2. An acidic oxide.
3. A substance has bad effect on ozone layer.
4. A water pollutant causes damage of brain cells.

## Question 2

**A Choose :**

1. The transitional elements start to appear from period .....
   a. 2 b. 3 c. 4 d. 5
2. Electronic configuration of the ions of all the following is similar to that of $_{18}Ar$ except .....
   a. $_{15}P$ b. $_{16}S$ c. $_{11}Na$ d. $_{17}Cl$
3. Water has ..... effect on litmus paper.
   a. basic b. acidic c. neutral d. alkaline
4. The ozone layer found in ..... layer.
   a. troposphere b. stratosphere c. mesosphere d. thermosphere

**B Write the balanced chemical equation for the following :**

1. Reaction of sodium with water.
2. Reaction of magnesium with dilute hydrochloric acid.
3. Reaction of carbon dioxide with water.
4. Two steps of ozone formation from oxygen by UV.

## Question 3

**A Write the importance of :**

1. Halons.
2. Liquid nitrogen.
3. Overuse of freon.
4. Altimeter.

**B Study the opposite figure which represents a section of the periodic table, then answer :**

What is the symbols which indicate the :

1. Inert gases.
2. Alkali metals.
3. Halogens.

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | | | | | | | | | | | | | | | | N | |
| | C | | | | | | | | | | | | I | K | | L | |
| B | | | | D | | | E | | F | | G | H | J | | | M | O |

## Question 4

**A Locate the position of the following elements in the modern periodic table :**

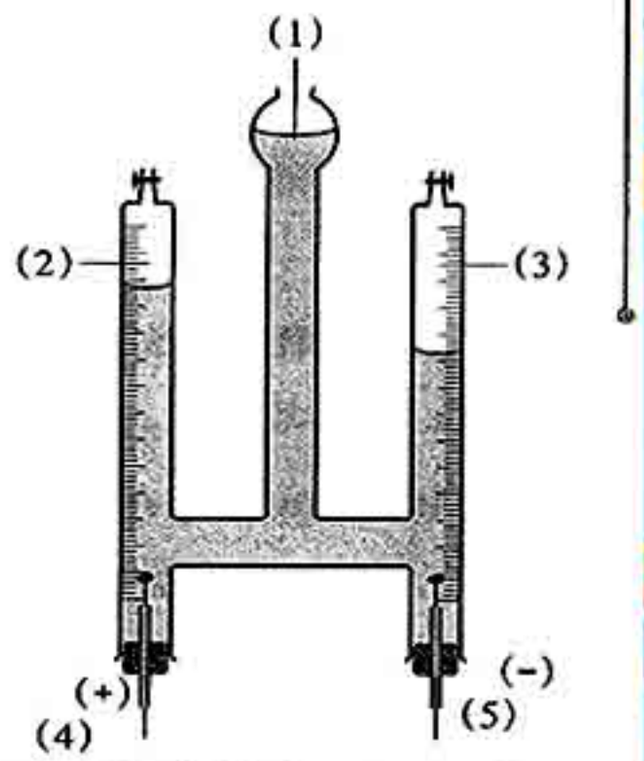
1. $_{13}Al$
2. $_{8}O$
3. $_{10}Ne$
4. $_{20}Ca$



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**B** From the opposite figure, answer the following questions :

1. What is the name of this apparatus ?
2. Label the numbers (1) , (2) , (3) , (4) and (5) ?
3. Calculate the volume of the gas that evolves at the positive pole if the volume of the gas at the negative pole is 20 $cm^3$.




## 7 Cairo Governorate

Shoubra Educational Zone
Good Shepherd School El-Attar

**Answer the following questions :**

### Question 1

**A** Choose the correct answer :

1. Meteors burn in .....
   a. mesosphere. b. ionosphere. c. stratosphere.
2. The number of groups in p-block is .....
   a. 5 b. 6 c. 7
3. ..... is located between stratosphere and mesosphere.
   a. Tropopause b. Stratopause c. Mesopause
4. An example of complete body fossil is .....
   a. mammoth. b. cast. c. mold.

**B** Correct the underlined words :

1. The polar compound is **an ionic** compound, the electronegativity difference between its elements is relatively high.
2. Panda bear is an example of **extinct** species.
3. Ultraviolet radiation has a **thermal** effect.
4. The **mold** is a copy of external shape of the shell.

**C** Write the balanced chemical equations which express the following :

1. Reaction of carbon dioxide with water.
2. Reaction of chlorine with potassium bromide.

### Question 2

**A** Complete the following statements :

1. ..... and ..... are microfossils used in petroleum exploration.
2. The ecosystem is classified according to degree of effect into ..... and .....



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PART 2

3. From advantages of Mandeleev table are ..... and .....
4. Group (7A) is called ....., while group zero is called .....
5. Among pollutants of ozone layer are ..... compounds used in air conditioning sets and ..... compounds used in fire extinguishers.

**B Mention one use for each of the following :**

1. Cobalt 60.
2. Ionosphere.

**C Mention one example of :**

1. Greenhouse gases.
2. Endangered animals.

## Question 3

**A Write the suitable scientific term :**

1. A metal doesn't react with water.
2. A protectorate characterized by presence of coral reefs and colored fish.
3. The weight of air column of an atmosphere height on a unit area.
4. A phenomenon appears as brightly colored light curtains at both poles of the Earth.
5. Fossils of organisms that lived in a short period of time in the past and become extinct.
6. A compound has a neutral effect on litmus paper.

**B Compare between :**

- Biological and chemical water pollution.

## Question 4

**A Give reasons for :**

1. Elements of group (1A) are called alkali metals.
2. Formation of ozone layer in the stratosphere.
3. Bald eagle is called by this name.

**B Problem :** Calculate the temperature at the top of a mountain if the temperature at sea level is 10°C and its height is 10 km.

**C Locate the position of the following elements in the modern periodic table :**

1. $_{11}Na$
2. $_{1}H$
3. $_{10}Ne$

# 8 Giza Governorate — El-Sadat Language School

**Answer the following questions :**

## Question 1

**A Complete :**

1. The type of bond in the water molecule is ..... , while the bond between water molecules is .....



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2. From greenhouse gases are ..... and .....
3. $Cl_2 + 2KBr \longrightarrow$ ..... + .....
4. Carbon dioxide gas is ..... oxide, while magnesium oxide is ..... oxide.
5. Fossils are used in ..... exploration and determining the age of .....

**B Locate the position and type of the following elements in the modern periodic table :**

1. $_2He$ 2. $_{17}Cl$ 3. $_{11}Na$ 4. $_{20}Ca$

## Question 2

**A Write the scientific term of the following :**

1. A layer of atmosphere in which satellites float.
2. The gas evolved at the cathode of Hufmann's voltameter.
3. They are natural safe areas to protect the endangered species.
4. A bright coloured light curtains are seen at two poles of Earth.

**B Give reasons for :**

1. Limestone rocks of El-Mokattam's mountain contain nummulites fossils.
2. Sodium and potassium are kept under kerosene surface.
3. The lower part of stratosphere layer is suitable for flying planes.
4. Liquefied nitrogen is used in preservation of cornea.

## Question 3

**A Calculate the height of a mountain if the temperature at its base is 25°C and at its top is (–14)°C.**

**B Choose the correct answer :**

1. An example of microfossils is .....
   a. mammoth. b. fern. c. radiolaria. d. archaeopteryx.
2. The largest atomic size in these elements has atomic number .....
   a. 7 b. 11 c. 9 d. 17
3. All of the following are extinct species except .....
   a. dodo bird. b. bald eagle. c. quagga. d. dinosaur.
4. The coldest layer is ..... layer.
   a. exosphere b. troposphere c. stratosphere d. mesosphere

**C Mention the importance of :**

1. Van-Allen belts. 2. Cobalt 60.

## Question 4

**A Show by the symbolic equations only how is the ozone gas formed ?**

**B What is meant by ... ?**

1. Global warming. 2. Fossils. 3. Metalloids.

**C Compare between simple ecosystem and complicated ecosystem. (two points).**



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الصف الثانى الاعدادى موقع ذاكرولى التعليمى كتاب المعاصر

PART 2

## 9 Giza Governorate

Experimental Directorate
Dr.Ahmed Zewail G.L.S

**Answer the following questions :**

### Question 1

**A Complete the following statements :**

1. The hottest layer in the atmosphere is ....., while the coldest layer is .....
2. From greenhouse gases are ..... and .....
3. Archaeopteryx is a fossil that links between ..... and .....
4. Ultraviolet rays have ..... effect, while infrared rays have ..... effect.

**B What is meant by ... ?**

1. Electronegativity.
2. Fossils.

### Question 2

**A Choose the correct answer :**

1. All of the following are endangered species except .....
   a. panda bear. b. bald eagle. c. quagga. d. rhinoceros.
2. The normal atmospheric pressure at the sea level equals ..... mb.
   a. 76 b. 1013.25 c. 1.013 d. 760
3. Luminous meteors are formed in ..... layer.
   a. ionosphere b. stratosphere c. exosphere d. mesosphere
4. Complete body fossils of insects are found preserved in .....
   a. amber. b. snow.
   c. sedimentary rocks. d. ocean.

**B Mention the function of :**

1. Altimeter.
2. Hofmann's voltameter.
3. Cobalt 60.
4. Natural protectorate.

**C Compare between :**

1. Simple ecosystem and complicated ecosystem.
2. Basic oxide and acidic oxide.

### Question 3

**A Give reason for each of the following :**

1. The lower part of stratosphere is a suitable for flying aeroplanes.
2. Elements of the same group have the same properties.
3. Group (1A) is called alkali metals.



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**B Mention the name of the scientist who :**

1. Discovered that the atom has 7 energy levels.
2. Discovered that the nucleus has positive charges called protons.
3. Postulated that the thickness of ozone layer is 3 mm at STP.

**C Write the balanced chemical equation which expresses the following reactions :**

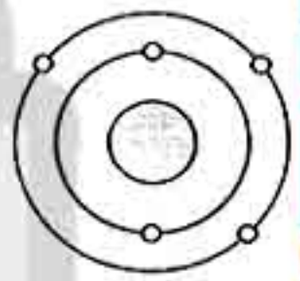
1. Putting a piece of sodium in water.
2. Burning magnesium ribbon in air.
3. Passing chlorine gas in potassium bromide solution.

## Question 4

**A Write the scientific term :**

1. Phenomenon that appear as a bright colours at the two poles.
2. The death of all members of species of living organisms.
3. Oxides that cause ozone hole and result from burning of fuel of concorde planes.
4. Thinning or losing parts of ozone layer.
5. Any change in the water properties that harm the human health or life.

**B Study the opposite figure which explains the electronic configuration for an element in the modern periodic table. Calculate the atomic number of the element which follows this element in :**



1. The same period.
2. The same group.

**C Problem :** Calculate the temperature at the top of a mountain if its height is 4 km and the temperature at its foot is 30°C.

# 10 Giza Governorate

Beu-lake Directorate
Dar El-Hanan L.S.

**Answer the following questions :**

## Question 1

**A Complete the following statements :**

1. The scientist ..... discovered the main energy levels around the nucleus, while the scientist ..... discovered the positive protons inside the nucleus.
2. The coldest layer in atmosphere is ..... but the hottest layer is .....
3. Archaeopteryx represents the link between ..... and .....

**B What is meant by ... ?**

1. Chemical activity series.
2. Index fossil.

**C Problem :** Find the temperature at the top of a mountain, its height is 3 km if the temperature at sea level is 20°C.



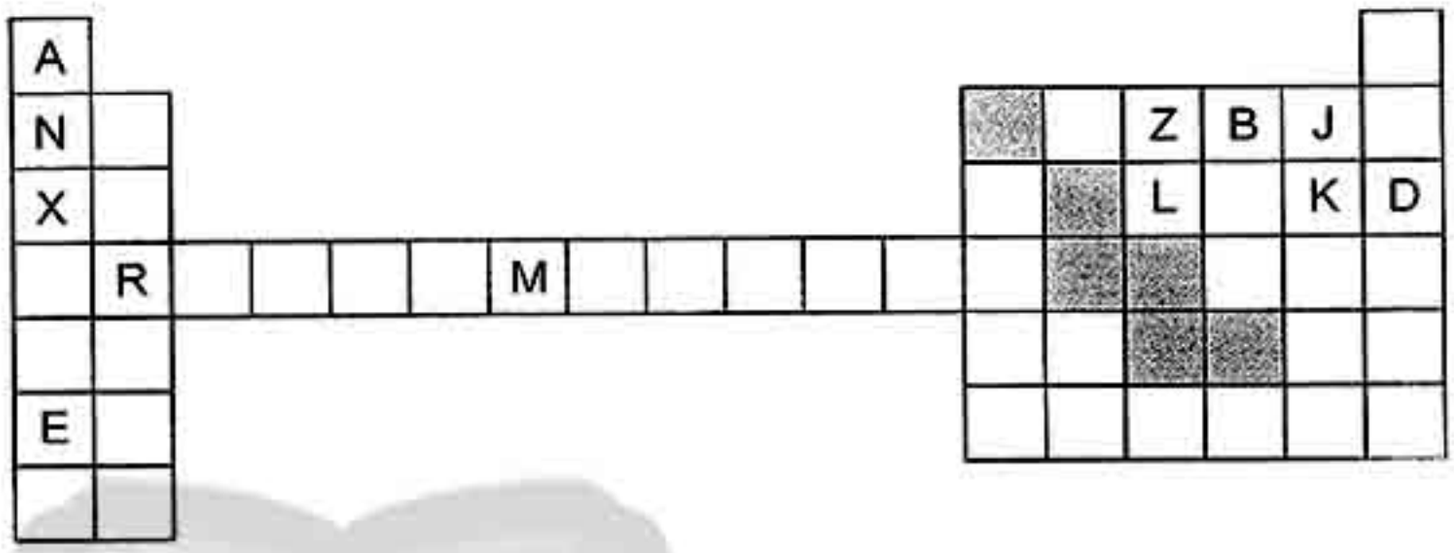
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كتاب المعاصر موقع ذاكرولى التعليمى الصف الثانى الاعدادى

PART 2

## Question 2

**A The opposite figure represents a part of the modern periodic table :**




1. What is the kind of (X - M - D) elements ?
2. What is the atomic no. of (B) element ?
3. What is the shaded area represent ?
4. Indicate :
   a. The most active metal.
   b. The largest size element in second period.

**B Give one example for :**

1. A trace.
2. An ozone pollutant.
3. An extinct bird.
4. A greenhouse gas.

## Question 3

**A Give reasons for :**

1. Liquefied nitrogen used in preserving eye cornea.
2. Rain, clouds and wind happen in troposphere.
3. Stop production of concorde (ultrasonic) planes.

**B Compare between :**

1. Mesosphere layer and stratosphere layer (in view of temperature and importance).
2. Simple ecosystem and complicated ecosystem.

## Question 4

**A Write the scientific term for the following statements :**

1. The ability of the atom to attract the bond electrons to itself in the covalent compound.
2. An atmospheric layer in which the atmosphere is inserted into the outer space.
3. Replacing part by part the original wooden material by silica.
4. Safe places which protect the endangered species in their homeland.

**B Write the chemical equation that indicates the following :**

Reaction between magnesium with oxygen gas.

**C Mention one importance for :**

1. The two Van-Allen belts.
2. Fossils.



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## 11 Giza Governorate

El-Haram Educational Zone
Sakkara Language School

**Answer the following questions :**

### Question 1

**Complete the following :**

1. Each period in the modern periodic table starts with ..... and ends with .....
2. ..... and ..... are from the extinct animals in the old ages.
3. Elements of group (1A) are called ..... metals.
4. Ultraviolet radiations have ..... effect, while infrared radiations have ..... effect.
5. Archaeopteryx represents the link between ..... and .....

### Question 2

**A Write the scientific term :**

1. The ability of the atom in the covalent molecule to attract the electrons of the chemical bond towards itself.
2. Two magnetic belts help in dispersing the harmful cosmic radiations away from the Earth.
3. Fossils of living organisms lived for a short period of time and in a wide geographical range and then became extinct.
4. The death of all members of a certain species of living organisms.
5. The block in the modern periodic table which contains series of lanthanides and actinides.
6. A layer of the atmospheric envelope in which the air moves vertically.

**B Mention one difference between :**

1. Mendeleev's periodic table and Moseley's periodic table.
2. Mesosphere and thermosphere.

### Question 3

**A Choose the correct answer :**

1. The elements which occupy the middle block of the modern periodic table are called ..... elements.
   a. alkaline  b. inert  c. halogen  d. transition
2. There are ..... bonds among the water molecules.
   a. ionic  b. covalent  c. hydrogen  d. metallic
3. The scientist who discovered the main energy levels is .....
   a. Rutherford.  b. Moseley.  c. Bohr.  d. Mendeleev.
4. All of the following are greenhouse gases except .....
   a. $CO_2$  b. $O_2$  c. $N_2O$  d. $CH_4$



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PART 2

5. Fossils are found in ..... rocks.
   a. igneous  b. volcanic  c. sedimentary  d. metamorphic
6. All of the following are endangered species except .....
   a. panda bear.  b. bald eagle.  c. quagga.  d. rhinoceros.
7. The height of the mountain where the temperature at its foot is 30°C and at its top is –9°C is ..... km.
   a. 6  b. 7  c. 8  d. 9

**B Mention one importance for :**

1. Liquefied nitrogen.  2. Altimeter.  3. Coral fossil.

## Question 4

**A Give reasons for :**

1. Cesium is considered as the strongest metallic element.
2. Cobalt 60 is used in preservation of food.
3. Water has high boiling point.
4. Barium oxide is considered as a basic oxide.
5. The lower part of the stratosphere layer is suitable for flying airplanes.

**B Mention one example for :**

1. Microfossils.  2. Halogens.

**C Locate the position of the following elements in the modern periodic table :**

1. $_{17}Cl$  2. $_{20}Ca$

## 12 Giza Governorate

6 of October Directorate
Smart Vision Language School

**Answer the following questions :**

## Question 1

**A Complete :**

1. From energy sublevels are s, p, d and .....
2. Elements of "d" block are called ..... elements.
3. Water has ..... effect on litmus solution.
4. From greenhouse gases are ..... and .....
5. Bluestone protectorate preserves ..... animal.
6. Alkali metals are located in group ..... but inert gases are located in group ..... in the modern periodic table.

**B Calculate the temperature at the Earth's surface if the temperature at a height 2 km is 13°C.**



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## Question 2

**A Choose :**

1. From gaseous elements in group (7A) is .....
   a. chlorine. b. iodine. c. fluorine. d. (a and c) together.
2. When water freezes, its density .....
   a. increases. b. decreases. c. doesn't change. d. risesup.
3. From types of fossils is are .....
   a. petrified fossils. b. mold. c. cast. d. all of them.
4. From complete body fossils is .....
   a. dinosaur. b. radiolaria. c. mammoth. d. worm.
5. If hydrogen volume in water electrolysis is 20 $cm^3$, so oxygen volume will be .....
   a. 5 $cm^3$ b. 10 $cm^3$ c. 20 $cm^3$ d. 40 $cm^3$
6. Halogens are called by this name because they react with ..... forming salts.
   a. acids b. bases c. water d. metals

**B Mention one use for :**

1. Liquefied nitrogen. 2. Aneroid.

## Question 3

**A Mention the scientific term :**

1. Continuous increase of the average temperature of the air near the surface of the Earth.
2. An animal is considered midway between horse and zebra.
3. A type of ultraviolet radiations that is absorbed mostly (95%) in the ozone layer.
4. Fossils of organisms lived in the past for a short time then extinct.
5. Safe places established to protect endangered species in their natural environment.
6. The scientist who discovered that the nucleus of atom contains positive protons.
7. The ability of atom in covalent molecule to attract the bond electrons to it.
8. The death of all members of certain species of living organisms.

**B Locate the position of $_{19}K$ in the modern periodic table.**

## Question 4

**A Correct the underlined words :**

1. There are **covalent** bonds between water molecules.
2. From endangered birds is **quagga**.
3. Fossils are preserved in **igneous** rocks.
4. Date of death of last individual of species is called **fossils**.
5. From non-polar compounds is **ammonia**.
6. The unit of measuring atomic radius is **Dobson unit**.

**B Give reasons for :**

1. Pilots prefer to fly at the lower part of stratosphere.
2. Dodo bird is an easy target for hunters.



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الصف الثانى الاعدادى موقع ذاكرولى التعليمى كتاب المعاصر

PART 2

## 13 Alexandria Governorate — Franciscan Sisters School Ibrahimieh

**Answer the following questions :**

### Question 1

**A Write the scientific term :**

1. The death of all members of species.
2. Elements that have both properties of metals and nonmetals.
3. The weight of air column of an atmosphere height on a unit area (1 $cm^2$ or 1 $m^2$).

**B Mention one difference between each of the following :**

1. Simple ecosystem and complicated ecosystem.
2. Stratosphere layer and mesosphere layer.

**C Choose the correct answer :**

1. The remains and traces of old living organisms preserved in sedimentary rocks is/are .....
   a. extinction. b. the red list. c. fossils. d. solidification.
2. Metal oxides are ..... oxides.
   a. acidic b. basic c. amphoteric d. neutral
3. The charged cosmic radiations are dispersed in the ..... layer.
   a. troposphere b. stratosphere c. mesosphere d. thermosphere
4. Ozone gas is measured in a unit called .....
   a. km. b. Dobson. c. millibar. d. $mm^3$.

### Question 2

**A Write the symbolic chemical equations representing the following reactions :**

1. Reaction of magnesium with oxygen then dissolution the product in water.
2. Reaction of chlorine with potassium bromide.
3. Dissolving carbon dioxide in water.

**B Write the atomic number of the following elements :**

1. Inert gas lies in the second period.
2. Halogen lies in the third period

**C Find the temperature at the base of a mountain, if you know that the temperature at its top equals (–10°C) and its height equals (4 km).**

### Question 3

**A What happens when ... ? And why ?**

1. A piece of sodium is exposed to moist air.
2. Decreasing the water temperature less than 4°C.



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الصف الثانى الاعدادى
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**B** On electrolysis of a certain volume of acidified water, if the volume of evolved gas above the anode was 2.5 $cm^3$ :

1. Calculate the volume of the evolved gas above the cathode.
2. What is the name of the gas that evolves above the anode and above the cathode ?
3. Mention the name of the apparatus which is used in this process.

**C** Put (✓) or (✗) and correct the mistakes :

1. The covalent bond becomes ionic when the difference in electronegativity between the bonded atoms = zero. ( )
2. All the atmospheric phenomena like rain, wind and clouds occur in the ionosphere. ( )
3. The elements with the same physical and chemical properties have been put in vertical columns. ( )

## Question 4

**A** Give the scientific reasons for the following :

- Fossils have importance.

**B** Complete the following sentences :

1. Each period in the modern periodic table starts with ..... and ends with .....
2. Sodium is kept under the surface of ..... , so as not to react with .....
3. Satellites float in ..... layer, while pilots prefer to fly in the lower part of ..... layer.
4. Ultraviolet radiation has a ..... effect, while infrared radiation has a ..... effect.

**C** Mention an example for each of the following :

1. Endangered species.
2. A gaseous halogen.
3. A fluorochlorocarbon compound.

## 14 Alexandria Governorate — Saint Vincent De Paul School

**Answer the following questions :**

## Question 1

**A** Choose the correct answer :

1. Mammoth fossil is an example of ..... fossils.
   a. cast  b. mold  c. petrified  d. complete body
2. Lanthanides are located in ..... block.
   a. (s)  b. (d)  c. (f)  d. (p)
3. Aluminium ($_{13}Al$) is located in .....
   a. period 3.  b. period 2.  c. period 7.  d. period 5.



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4. Adding drops of ..... to water during its electrolysis.
   a. nitric acid
   b. sulphuric acid
   c. hydrochloric acid
   c. no correct answer

**B Give reasons for :**

1. Melting of ice of south and north poles.
2. Ammonia is considered a polar covalent compound.
3. The atomic size of $_{11}Na$ is greater than $_{17}Cl$.
4. The lower part of stratosphere is suitable for flying aeroplanes.

**C If the temperature at the foot of a mountain is 40°C. Calculate the temperature at its top if the height of the mountain is 3 km.**

## Question 2

**A Complete the following :**

1. Ozone degree is measured in a unit called .....
2. ..... is the weight of air column of an atmospheric height on a unit area.
3. A sticky matter secreted from the pine trees to form the fossil of .....
4. The scientist ..... had discovered the energy levels.

**B Compare between :**

1. Altimeter and aneroid.
2. Basic oxides and acidic oxides.

## Question 3

**A Write the scientific term :**

1. Rays which are emitted from cobalt (60).
2. Elements have the symbol (B).
3. Two magnetic belts help in dispersing the harmful radiation away from the Earth.
4. Substitution of silica in place of wood without changing in the form.
5. Organic matter prevents alkali metals from reacting with moist air.

**B Write the chemical equations which express the following :**

1. Reaction of bromine with potassium iodide.
2. Electrolysis of water.
3. Reaction of magnesium with hydrochloric acid.

**C Draw the bonds between the atoms and molecules in water.**

## Question 4

**A What is meant by ... ?**

1. Electronegativity.
2. Aurora phenomenon.
3. Metalloids.
4. Global warming phenomenon.



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**B** Correct the underlined words :

1. Each period ends by **a nonmetal element**.
2. Halogens are **monovalent metals**.
3. Normal atmospheric pressure equals 76 **millibar**.
4. The **halons** are produced from supersonic airplanes.

## 15 Alexandria Governorate

East Educational Zone
Sidi Gaber Language School

Answer the following questions :

### Question 1

**A** Give a scientific term for each of the following statements :

1. Safe areas established to protect endangered species in their homeland.
2. Ability of an atom to attract the electrons of a chemical bond.
3. Arrangement of elements in a descending order according to their chemical activity.
4. An atmospheric layer that contains 75% of the mass of atmospheric air and in which all weather phenomena occur.
5. Traces and remains of old living organisms that are preserved in sedimentary rocks.
6. A block in the periodic table that contains groups from (3A) to (7A).
7. Elements having the properties of metals and nonmetals.

**B** What would happen if ... ?

1. Ionosphere wasn't surrounded by two magnetic belts.
2. Methyl bromide was overused as an insecticide.

### Question 2

**A** Complete the following sentences :

1. In the modern periodic table, the strongest ..... lie in group (1A), while the strongest ..... lie in group (7A).
2. Liquefied nitrogen is used to preserve ..... , while liquid sodium is used in .....
3. Van-Allen belts cause the ..... phenomenon which takes place in the two poles of .....
4. In water molecules, there are two ..... bonds, the angle between them is .....
5. ..... and ..... are two gaseous halogens.
6. Archeopteryx represents the link between ..... and .....
7. ..... and ..... are from the most dangerous pollutants of ozone layer.

**B** Give reason for each of the following :

1. Pilots prefer flying in the stratosphere layer.
2. Water shouldn't be used to put off a sodium fire. (Give a balanced chemical equation)



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## Question 3

**A Choose the correct answer :**

1. An element $_{17}X$ is similar to .....
   a. $_{2}A$ b. $_{19}Z$ c. $_{9}L$ d. $_{7}Y$
2. ..... discovered that a nucleus contains positively charged protons.
   a. Mendeleev b. Einstein c. Rutherford d. Bohr
3. Meteors are formed in ..... layer.
   a. mesosphere b. ionosphere c. stratosphere d. exosphere
4. All of the following are endangered species except .....
   a. quagga. b. bald eagle. c. panda bear. d. ibis bird.
5. All of the following diseases are caused by biological pollution except .....
   a. bilharzia. b. typhoid. c. hepatitis. d. cancer.
6. All of the following are greenhouse gases except .....
   a. $CH_4$ b. $N_2O$ c. $O_2$ d. $CO_2$
7. ..... is a natural protectorate characterized by the presence of rare coral reefs and coloured fish.
   a. Panda protectorate b. Ras Mohamed protectorate
   c. Bluestone protectorate d. Wadi Hetan protectorate

**B Complete and balance the following equations :**

1. $Mg + ..... \xrightarrow{dil.} MgCl_2 + H_2\uparrow$ 2. $CO_2 + H_2O \longrightarrow .....$
3. $Br_2 + 2KI \longrightarrow ..... + .....$

## Question 4

**A Correct the underlined word(s) :**

1. Ice crystals have **pentagonal** shape.
2. **Thermal** pollution originates from leakage of radioactive substances from nuclear reactors.
3. Water has a **basic** effect on litmus paper.
4. **Ferns** fossils indicate that they lived in clear, warm and shallow seas.

**B Calculate the height of a mountain given that the temperature at its base = 40°C and at its top = –12°C.**

**C Give two negative effects for global warming phenomenon.**

**D Locate the position of the following elements in the modern periodic table :**

1. $^{40}_{20}Ca$ 2. $^{27}_{13}Al$



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## 16 El-Kalyoubia Governorate — Science Inspectorate

**Answer the following questions :**

### Question 1

**A Complete the following sentences :**

1. $2H_2O \xrightarrow{\text{Electrolysis}}$ ..... + .....
2. Lithium and sodium ..... on the surface of water as their densities are ..... than water density.
3. There are three types of ultraviolet rays, near ultraviolet rays, ..... ultraviolet rays and ..... ultraviolet rays.
4. The atmospheric envelope height from sea level is ..... , while normal atmospheric pressure equals ..... millibar.
5. ..... + ..... $\xrightarrow{\text{Dilute}} MgCl_2 + H_2$

**B Locate the position of the following elements in the modern periodic table :**

1. $_{13}Al$ 2. $_{10}Ne$ 3. $_{17}Cl$

**C Compare between the following :**

Simple ecosystem and complicated ecosystem and mention examples.

### Question 2

**A Write the scientific term for each of the following sentences :**

1. The traces and remains of the old living organisms which are preserved in sedimentary rocks.
2. The elements that have the properties of metals and nonmetals.
3. They are two belts surround the atmosphere from outside and help in scattering the harmful cosmic radiations come from the Sun.
4. Safe places that are specified to protect the endangered species in their natural environment.

**B Give reasons for :**

1. Water and ammonia are polar compounds.
2. Cobalt 60 is used in food preservation.
3. Ionosphere layer is important for radio stations.

**C If the temperature at the foot of Everest mountain is 22.6°C, find the temperature at its top of a height 8862 m. above the Earth's surface.**

### Question 3

**A Choose the correct answer :**

1. Ice crystals have ..... shape.
   a. hexagonal b. square c. pentagonal d. triangular



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2. Each period in the modern periodic table starts with a/an .....
   a. semi-metallic element. b. nonmetallic element.
   c. inert gas. d. metallic element.
3. An example of microfossils is .....
   a. mammoth. b. ferns. c. foraminifera. d. archaeopteryx.
4. The important layer of the atmospheric envelope for man's life is called .....
   a. thermosphere. b. stratosphere. c. troposphere. d. mesosphere.

**B What is the importance of the following ... ?**

1. Liquefied nitrogen. 2. Altimeter.

**C Put (✓) or (✗) and correct the wrong ones :**

1. The main energy levels had discovered by Moseley. ( )
2. Water has an acidic effect on litmus paper. ( )
3. The most important greenhouse gases are $CO_2$, $CH_4$, $N_2O$, $H_2O$ and CFCs. ( )
4. The measurement unit of the degree of ozone layer is bar. ( )

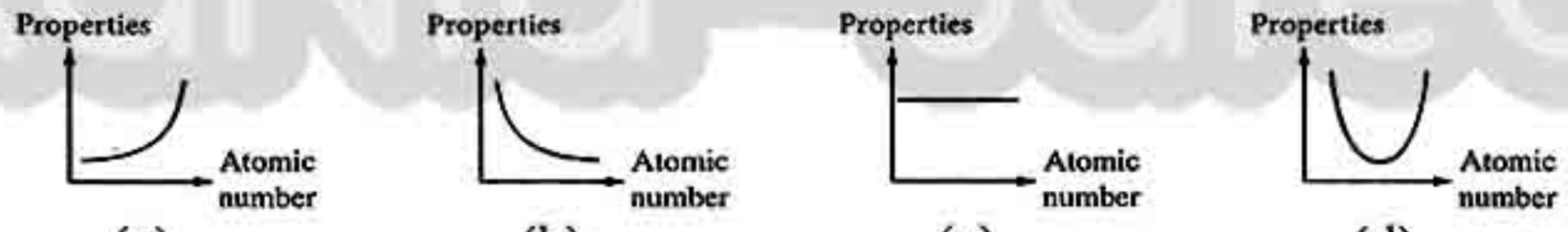
## Question 4

**A Correct the underlined words in the following statements :**

1. **Dodo bird** is endangered animal.
2. Eating food containing high ratios of **arsenic** causes the death of brain cells.
3. **Bohr** arranged the elements ascendingly according to their atomic weights.
4. Meteors burn in **thermosphere** layer.
5. If the metal lost one electron or more, it will become **negative** ion.

**B Which of the following figures represents :**

• The relation between the nonmetallic property and atomic number of elements of group (7A).




**C Define the following :**

1. Extinction. 2. The isobar.

## 17 El-Menofia Governorate — Science Inspectorate

**Answer the following questions :**

## Question 1

**A Complete the following :**

1. The new number of zero group is ....., while that of group (5A) is .....



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2. ..... is used in food preservation, because it emits ..... rays which prevent the production of microbical cells.
3. $Cl_2 + 2KBr \longrightarrow$ ..... + .....
4. The bond between oxygen atom and hydrogen atom in water molecule is ....., while bonds among water molecules are ..... bonds.
5. There is ..... fossils in the ..... rocks which form El-Mokattam's mountain.

**B Calculate the atomic number of the following elements :**

1. A metallic element, its valency is divalent and locates in the third period.
2. A noble gas locates in the third period.
3. An element is located in the 1st period and group (1A).

**C Problem :**

If the temperature at the top of a mountain is –5°C and at a point in its middle is 8°C, calculate the height of the mountain and the temperature at its base.

## Question 2

**A Choose the correct answer :**

1. The number of elements which exist in nature is .....
   a. 99 b. 118 c. 24 d. 92
2. The elements which occupy the middle block (d) in the periodic table are called ..... elements.
   a. transition b. alkali c. alkaline Earth d. noble
3. If the sum of volumes of evolved gases at two poles of Hofmann's voltameter is 60 $cm^3$ so, the volume of oxygen gas and hydrogen gas is ..... respectively.
   a. 20 : 40 b. 40 : 20 c. 30 : 30 d. 15 : 45
4. The ..... layer is much vaccumed layer.
   a. troposphere b. stratosphere c. mesosphere d. thermosphere

**B What is meant by ... ?**

1. Atmospheric pressure. 2. Hydrogen bond. 3. Fossils.

**C Choose the odd word out and write the scientific term for others :**

1. Nitrogen oxides - Water vapour - Freon - Halons.
2. Quagga - Dodo bird - Dinosaur - Bald eagle.

## Question 3

**A Put (✓) or (✗), then correct the wrong ones :**

1. Water has a neutral effect on litmus solution. ( )
2. Magnesium and potassium are kept under the surface of kerosene. ( )
3. Altimeter is an instrument used to determine the elevation of aeroplanes from sea level. ( )
4. The archaeopteryx fossil is a kind of extinct elephants. ( )
5. Papyrus is considered an extinct plant. ( )



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PART 2

**B** Give reasons for :

1. Elements of the same group have similar properties.
2. Barium oxide is considered a basic oxide.
3. Ionosphere is important for radio station.

**C** What is the importance of ... ?

1. Liquefied nitrogen.
2. Nummulite fossil.

## Question 4

**A** Write the scientific term :

1. The halogen which exists in a solid state.
2. Two magnetic belts that help in scattering of harmful cosmic radiations away from the Earth.
3. Fossils of organisms that had lived for a short period of time in the past and had a wide geographic distribution.
4. The path which the energy takes when it is transported from a living organism to another one inside the environmental system.

**B** Compare between :

Group (1A) and group (7A) related to [name - valency - kind of formed ions].

**C** Mention an example for each of the following :

1. A trace fossil.
2. A non-polar compound.

# 18 El-Dakahlia Governorate — Educational Directorate

**Answer the following questions :**

## Question 1

**A** Choose the correct answer :

1. Meteors are formed in .....
   a. thermosphere. b. mesosphere. c. stratosphere. d. exosphere.
2. Which of the following belongs to the same group in the periodic table .....
   a. Na, Li b. Na, Cu c. Na, Ne d. Na, C
3. The ozone is measured in a unit called .....
   a. km b. °C c. Dobson d. millibar
4. Each period in the modern periodic table starts with ..... element.
   a. semi-metallic b. inert c. nonmetallic d. metallic
5. All of the following are greenhouse gases except .....
   a. $O_2$ b. $CO_2$ c. $N_2O$ d. $CH_4$



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**B Complete the following sentences :**

1. The nanometer equals ..... meter.
2. The ozone layer doesn't allow the passage of ..... ultraviolet rays.
3. ..... is non-flying and an extinct bird.
4. ..... predicated the ability of discovering new elements, so he left spaces in his table.

## Question 2

**A Put (✓) or (✗) for each of the following statements :**

1. There are fossils of complete insects kept in amber. ( )
2. Sufficiency of plants on the Earth leads to the increase in temperature. ( )
3. The troposphere layer is the suitable layer for flying planes. ( )
4. The angle between covalent bonds in water molecule is 100°. ( )

**B Write the balanced chemical equations for each of the following :**

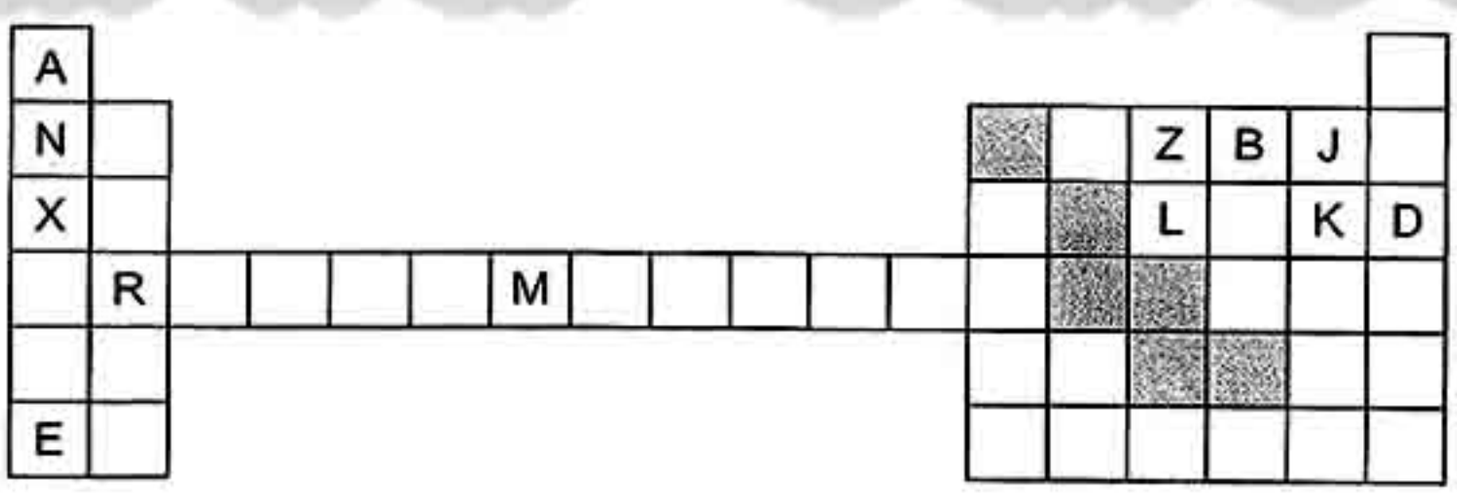
1. Dissolving of magnesium oxide in water.
2. Reaction of carbon dioxide with water.

## Question 3

**A Give reason for each of the following :**

1. Oxygen gas evolves at the anode and hydrogen gas evolves at the cathode.
2. Occurrence of aurora phenomenon.
3. Sodium fires are not put off with water.
4. Water molecule is from polar compounds.

**B Study the following figure which represents a section of a periodic table, then answer :**




1. Mention the atomic number of element (B).
2. What do shaded area represent ?
3. Mention the symbol which represents :
   a. The most active element in group (1A).
   b. The element which has the largest atomic size in the second period.



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PART 2

## Question 4

**A Write the scientific term :**

1. Tracess and remains of the old living organisms that are preserved in sedimentary rocks.
2. An instrument used by pilots to measure the elevation from the sea level.
3. They are safe areas established to protect endangered species in their homeland.
4. The weight of air column of atmospheric air on a unit area.
5. A charged layer reflects radio waves.
6. The most dangerous ozone pollutants known as freon.

**B Choose from column (B) what suits it in column (A) :**

| (A) | (B) |
|---|---|
| 1. The process of converting the part of living organism to petrified material.<br>2. The fossils which are in the rocks of different regions and indicate the extinction and evolution of organisms. | a. fossil record<br>b. petrification<br>c. protectorates |

## 19 El-Sharkia Governorate — Directorate of Education

**Answer the following questions :**

## Question 1

**A Complete the following sentences :**

1. Mendeleev arranged the elements ascendingly according to ....., while Moseley arranged them ascendingly according to .....
2. Elements of group (7A) are called .....
3. The modern periodic table consists of ..... horizontal periods and ..... vertical groups.
4. A bond that exists between water molecules is called .....
5. $Cl_2 + 2KBr \longrightarrow$ ..... + .....

**B Locate the position of the following elements in the modern periodic table :**

1. $_{19}K$ 2. $_{13}Al$ 3. $_{10}Ne$ 4. $_{12}Mg$

**C Calculate the height of a mountain if the temperature at its base is 30°C and at its top is (–9°C).**

## Question 2

**A Choose :**

1. The volume of oxygen gas evolving from water electrolysis equals ..... the hydrogen volume.
   a. half b. double c. four times d. quarter



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2. All of the following gases are greenhouse gases except .....
   a. $CO_2$ b. $O_2$ c. $N_2O$ d. $CH_4$
3. Complete body fossils of insects are found preserved in .....
   a. amber. b. snow. c. sedimentary rocks. d. ocean.
4. ..... causes blindness.
   a. Lead b. Mercury c. Sodium d. Arsenic

**B Define :**

1. Global warming phenomenon.
2. Chemical activity series.

**C Mention one example for each of the following :**

1. Extinct bird. 2. Most active metal.
3. Endangered bird.

## Question 3

**A Correct the underlined words :**

1. Archaeopteryx represents the link between reptiles and **mammals**.
2. Meteors burn in **thermosphere** layer.
3. Ultraviolet radiation has a **thermal** effect.
4. **Dinosaur** is a mammal animal that has a shape midway between horse and zebra.

**B Mention one use for each of the following :**

1. Liquefied nitrogen. 2. Silicon. 3. Cobalt 60.

**C Give reasons for :**

1. Sodium is kept under the surface of kerosene.
2. The lower part of stratosphere is suitable for flying aeroplanes.

## Question 4

**A Write the scientific term :**

1. A phenomenon that appears as brightly coloured light curtains seen from the both poles of the Earth.
2. Safe place that are specified to protect the endangered species in their homeland.
3. The weight of air column of an atmosphere height on a unit area ($1m^2$).
4. The ability of the atom in the covalent molecule to attract the electrons of the chemical bond towards itself.
5. The traces that indicate the remains of an old living organism after death.
6. Elements that have both properties of metals and nonmetals.

**B Compare between :**

Simple ecosystem and complicated ecosystem.

**C Write the balanced chemical equation which expresses the reaction of :**

1. Carbon dioxide with water.
2. Magnesium with dilute hydrochloric acid.



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PART 2

## 20 El-Gharbia Governorate — Central Science Supervision

**Answer the following questions :**

### Question 1

**A Complete the following statements :**

1. Moseley arranged the elements ascendingly according to ..... , while Mendeleev arranged them ascendingly according to .....
2. Most of weather features occur in ..... layer, whereas satellites swim through the ..... layer.
3. Sodium is kept under the surface of ..... to prevent it from the reaction with ..... air.
4. Ultraviolet radiation has a ..... effect, and the infrared radiation has a ..... effect.
5. To obtain a complete body fossil of organism, it must be ..... fast as soon as it died in medium protects it from .....

**B Give reason for each of the following :**

1. Formation of ozone layer in stratosphere.
2. Naming the petrified forests with wood mountain.

**C Locate the position of each element in the modern periodic table :**

1. Calcium ($_{20}Ca$).
2. Sulphur ($_{16}S$).

### Question 2

**A Write the scientific term, which refers to each of the following statement :**

1. The descending arrangement of elements according to their chemical activities.
2. A phenomenon that appears as brightly coloured light curtains at both the poles of the Earth.
3. Remains or traces of organisms that lived in the past were preserved in sedimentary rocks.
4. Continuous decrease in numbers of species without compensation until all die out.

**B Write the balanced chemical equations representing the following :**

1. The reaction between magnesium and dilute hydrochloric acid.
2. The reaction between bromine with potassium iodide.
3. The electrolysis of water.

**C Calculate the height of a mountain if the temperature at its base is 30°C and at its top is (–9°C).**

### Question 3

**A Choose the correct answer :**

1. The scientist who discovered the main energy levels is .....

a. Moseley. b. Bohr. c. Hofmann. d. Mendeleev.



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2. The coldest atmospheric layer is .....
   a. troposphere. b. stratosphere. c. mesosphere. d. thermosphere.
3. Each period in the periodic table starts with a/an .....
   a. metal. b. metalloid. c. non-metal. d. inert gas.
4. Complete body fossils of insects are found preserved in .....
   a. ammonites. b. amber. c. igneous rocks. d. ambergris.
5. The snow crystal has ..... shape.
   a. octagonal b. quadrilateral c. pentagonal d. hexagonal

**B What will happen when ... ?**

1. Storing water in plastic bottles.
2. Increasing the ratio of greenhouse gases in the atmosphere.

**C Mention one use of each of the following :**

1. Liquefied nitrogen. 2. Aneroid.

## Question 4

**A Correct the underlined words :**

1. Nonmetal oxides are considered **basic oxides**.
2. Ozone layer is measured in a unit called **picometer**.
3. The **nummulites** fossil is used for indicating the age of sedimentary rocks.
4. **Ibis bird** is from the birds that can't fly because of its small wings.

**B Choose the odd word out, then mention what the rest has in common :**

1. Lithium - Cesium - Sodium - Magnesium.
2. Methane gas - Carbon dioxide gas - Oxygen gas - Nitrous oxide.

**C Arrange the following :**

1. In a descending order according to electronegativity.
   ${}_{6}C$ - ${}_{9}F$ - ${}_{8}O$ - ${}_{7}N$
2. Fossils starting with first appearance on the life stage.
   Mold fossil of fish - Mammoth fossil - Trilobite fossil - Archaeopteryx.

# 21 Damietta Governorate — Damietta Educational Directorate

**Answer the following questions :**

## Question 1

**A Complete the following statements :**

1. There are ..... bonds between water molecules, while the bonds between atoms in water molecules are ..... bonds.



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PART 2

2. The ultraviolet radiation has a ..... effect, and the infrared radiation has a ..... effect.
3. Elements of group (1A) are called ....., while elements of group (7A) are called .....
4. The highest temperature layer in the atmosphere is ..... and the least one is .....

**B Mention one use for each of the following :**

1. Altimeter. 2. Index fossil. 3. Liquefied nitrogen.

**C Locate the position of the following elements in the modern periodic table :**

1. $_{19}K$ 2. $_{10}Ne$

## Question 2

**A Write the scientific term for the following :**

1. They are safe areas established to protect endangered species in their homeland.
2. Elements that have both properties of metals and nonmetals.
3. The halogen which exists in a liquid state.
4. Remains of old living organisms that preserved in sedimentary rocks.
5. The weight of air column of an atmosphere height above a unit area.

**B Compare between each of the following (one point only for each) :**

1. Simple ecosystem and complicated ecosystem.
2. Near ultraviolet rays and far ultraviolet rays.

**C Mention the harms of :**

Storing tap water in plastic bottles.

## Question 3

**A Choose the correct answer :**

1. Carbon dioxide dissolves in water forming .....
   a. base. b. acid. c. neutral. d. halogen.
2. All of the following are endangered species except .....
   a. panda bear. b. bald eagle. c. quagga. d. rhinoceros.
3. ..... react very slowly with cold water.
   a. K and Na b. Ca and Mg c. Zn and Fe d. Cu and Ag
4. Meteors are formed and burned in ..... layer.
   a. troposphere b. stratosphere c. mesosphere d. thermosphere
5. ..... is an example of complete body fossils.
   a. Mammoth b. Ferns c. Coral d. Foraminifera

**B Write the balanced chemical equations which express the following reactions :**

1. Sodium with water. 2. Dissolving of magnesium oxide in water.
3. Bromine with potassium iodide.

**C Mention the measuring unit of :**

1. The degree of ozone layer. 2. The atomic size of element.



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## Question 4

**A Give reasons for :**

1. Silicon slides are used in manufacturing of computers.
2. Elements of the same group have similar properties.
3. Water has high boiling point.

**B What is meant by ... ?**

1. Van-Allen belts.
2. Chemical activity series.
3. Petrification.

**C Correct the underlined words :**

1. **Ozone** is the curved lines that join the points of equal pressure in atmospheric pressure maps.
2. **Quagga** is the most famous extinct animal in the old times.
3. Water has **alkaline** effect on litmus solution.

# 22 Kafr El-Sheikh Governorate — Science Director - General

**Answer the following questions :**

## Question 1

**A Complete the following statements :**

1. The modern periodic table consists of ..... horizontal periods and ..... vertical groups.
2. Most of weather features occur in ..... layer, while satellites rotate in ..... layer.
3. Archaeopteryx represents the link between ..... and .....
4. $Cl_2 + 2KBr \longrightarrow$ ..... + .....

**B Explain the behaviour of the following elements with water :**

1. Iron.
2. Potassium.

## Question 2

**A Choose the correct answer :**

1. Which of the following fossils plays an important role in petroleum exploration ? .....
   a. Foraminifera and radiolaria. b. Nummulites. c. Foraminifera and trilobite.
2. The ..... is/are used in preservation of agricultural crops.
   a. methyl bromide gas b. halons c. nitrogen oxide
3. The hottest atmospheric layer is .....
   a. troposphere. b. mesosphere. c. thermosphere.
4. The elements of group (7A) are known as .....
   a. alkali metals. b. halogens. c. alkaline Earth metals.
5. There are ..... bonds among water molecules.
   a. ionic b. hydrogen c. covalent



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PART 2

6. Nonmetal oxides are ..... oxides.
   a. acidic  b. basic  c. amphoteric
7. All of the following are greenhouse gases except .....
   a. $CH_4$  b. $N_2O$  c. $O_2$

**(B) Give reasons for :**

1. The atmospheric pressure decreases as we go up.
2. Sodium fires do not put off with water.

## Question 3

**(A) Write the scientific term :**

1. The vertical columns in modern periodic table.
2. Traces and remains of living organisms that are preserved in sedimentary rocks.
3. Decrease in thickness of ozone layer.
4. The two magnetic belts that help in dispersing the harmful charged cosmic radiations.
5. The gas which is collected at the anode in water electrolysis.
6. The radioactive element which is used in food preservation.

**(B) Locate the position of the following elements in the modern periodic table :**

1. $[_{19}K]$  2. $[_{9}F]$  3. $[_{5}B]$  4. $[_{10}Ne]$

## Question 4

**(A) Put (✓) or (✗) in front of each of the following :**

1. The air moves horizontally in the lower part of the stratosphere. ( )
2. Ice crystals have pentagonal shapes. ( )
3. In the period, as the atomic number increases the metallic property increases. ( )
4. The fossil record indicates the age of the sedimentary rocks. ( )
5. The ozone degree is measured in a unit called Dobson. ( )

**(B) Calculate the height of a mountain if the temperature at its base is [30°C] and at its top is [–9°C].**

# 23 El-Behira Governorate

Kafr El-Dawar Educational Zone
El-Safwa Private Schools

**Answer the following questions :**

## Question 1

**(A) Complete the following :**

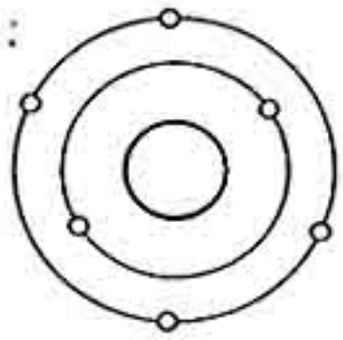
1. Ozone layer lies in ..... layer.
2. Nummulites fossil is an example of ..... fossils but amber fossil is an example of ..... fossils.
3. There are ..... bonds between molecules of water.



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4. ..... and ..... are examples of some extinct species in the old times.
5. ..... is an instrument used to determine the possible day weather.
6. ..... is considered form safe places that has endangered species.

**B Mention the atomic number of the element that follows that element in :**



1. The same period.
2. The same group.

## Question 2

**A Choose the correct answer :**

1. The scientist who left gaps in his table to be filled with suitable discovered elements in future is .....
   a. Moseley. b. Rutherford. c. Bohr. d. Mendeleev.
2. ..... is the hottest atmospheric layer.
   a. Stratosphere b. Mesosphere c. Thermosphere d. Troposphere
3. The snow crystal has ..... shape.
   a. octagonal b. quadrilateral c. pentagonal d. hexagonal
4. ..... is an example of endangered living organisms.
   a. Bald eagle b. Passenger pigeon c. Tasmanian cat d. Dinosaur

**B Mention the diseases which are causes by :**

1. Mixing animals and human wastes with water.
2. Drinking water contains high concentration of mercury.

**C Give one example for :**

1. An element reacts instantly with water.
2. A plant is endangered.
3. An element is used in preservation of cornea of eye.

## Question 3

**A Write the scientific term :**

1. Elements which have properties of metals and nonmetals.
2. A group contains the strongest nonmetal.
3. It is a region in which the atmosphere envelope is inserted in outer space.
4. A bird is characterized by small wings and short legs.
5. They are traces and remains of old living organisms that are preserved in sedimentary rocks.
6. An atmospheric layer in which air currents move vertically.

**B Give reasons for :**

1. The lower part of stratosphere is suitable for flying airplanes.
2. Petrified wood are considered fossils although they look like rocks.

**C Write the chemical equations represent each of the following :**

1. Dissolving of magnesium oxide in water.
2. Reaction of chlorine with potassium bromide.



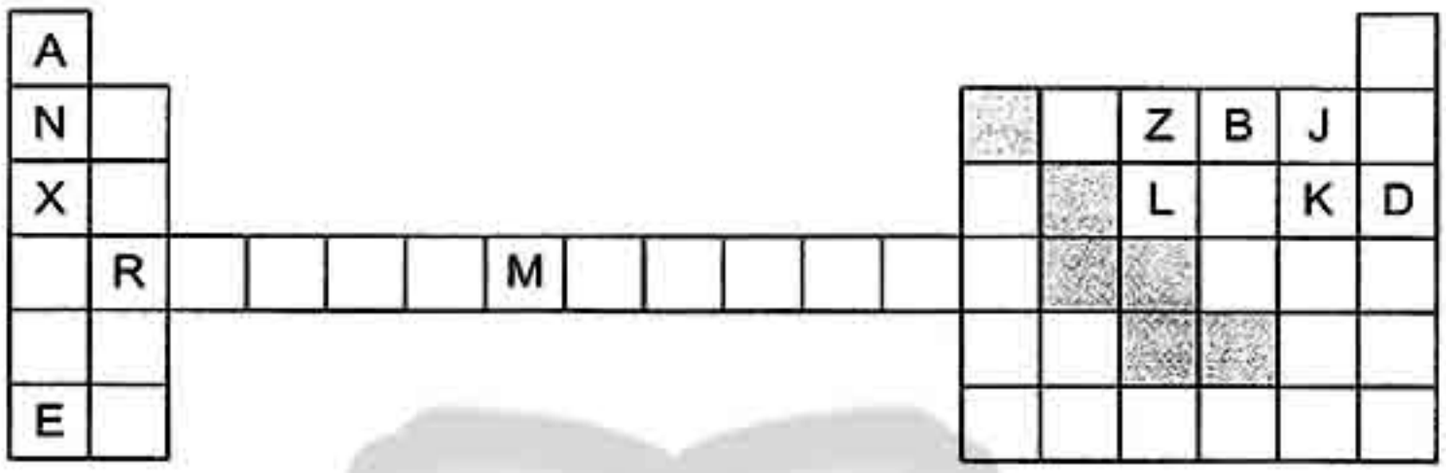
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## PART 2

### Question 4

**A** Look at the following diagram which represents a part of the modern periodic table, then answer :




Write the letter (s) which represent (s) :

1. Transition element.
2. The strongest metal.
3. The strongest nonmetal.
4. Noble gas.

**B** Define :

1. Chemical activity series.
2. Extinction.
3. Electronegativity.
4. Atmospheric pressure.

**C** Calculate the height of a mountain if the temperature at its base is 20°C and at its top is (–6°C).

## 24 Ismailia Governorate — Directorate of Education

Answer the following questions :

### Question 1

**A** Complete the following :

1. Mendeleev arranged the elements ascendingly according to ....., while Moseley arranged them ascendingly according to .....
2. The highest temperature atmospheric layer is ..... and the least temperature one is .....
3. $Mg + 2HCl \longrightarrow$ ..... + .....
4. Among the pollutants of the ozone layer are ..... compounds that are used in air conditioning sets and ..... compounds that are used in extinguishing fires.

**B** $C + O_2 \xrightarrow{\Delta} (A)$

$(A) + H_2O \longrightarrow (B)$

1. Write the chemical formula of (A) and (B).
2. Mention the effect of (B) on a litmus paper.



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## Question 2

**A Compare between (in a table) :**

1. Simple ecosystem and complicated ecosystem.
   (according to : Number of members - Example)
2. Troposphere and stratosphere layers.
   (according to : Height - Temperature at its top)

**B What is meant by ... ?**

1. Fossils.
2. Chemical activity series.
3. Electronegativity.

**C Study the opposite figure, then answer :**

| A |
|---|
| $_{11}$B |
| C |
| D |

1. Locate the position of element (B) in the modern periodic table.
2. The figure represents group ..... which are named as .....
3. What is the periodic number of the elements (C) and (D) ?

## Question 3

**A What happens when ... ?**

1. Melting of the snow of the two poles.
2. Overuse of methyl bromide.
3. Drinking water with high concentration of mercury.

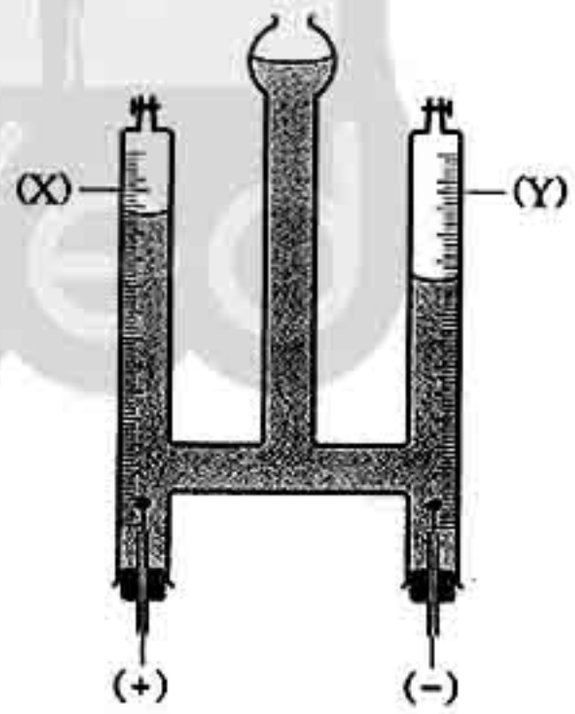
**B Write the scientific term :**

1. Safe areas established to protect endangered species in their homeland.
2. Two magnetic belts help in scattering the harmful radiation away from the Earth.
3. A solid halogen.

**C Mention the importance of the following :**

1. Liquefied nitrogen.
2. Cobalt 60.
3. Altimeter.
4. Coral fossil.

**D From the opposite figure, answer the following :**




1. What's the name of this apparatus ?
2. Letter (X) on the figure represents .....
3. Letter (Y) on the figure represents .....
4. Write the symbolic balanced chemical equation.

## Question 4

**A Choose :**

1. ..... fossils are found in limestone rocks of El-Mokattam mountain.
   a. Ferns  b. Radiolaria  c. Nummulites  d. Fish
2. All of the following are from semi-metals except .....
   a. tellurium.  b. silicon.  c. boron.  d. bromine.
3. The scientist ..... discovered the main energy levels of the atom.
   a. Bohr  b. Mendeleev  c. Newton  d. Moseley
4. All of the following are from greenhouse gases except .....
   a. nitrogen oxide.  b. $CO_2$  c. water vapour.  d. nitrous oxide.



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PART 2

Ⓑ Give reasons for :

1. Water has high boiling point.
2. Sodium and potassium are kept under kerosene surface.
3. Ionosphere layer is important for radio stations.

Ⓒ Calculate the temperature at the top of a mountain which its height is 5000 meters, if the temperature at the base of that mountain is 28°C.

## 25 Port-Said Governorate

Educational Directorate
Science Inspectorate for Language Schools

Answer the following questions :

### Question 1

Ⓐ Complete the following statements :

1. The modern periodic table consists of ..... horizontal periods.
2. Archaeopteryx represents the link between ..... and .....
3. Ultraviolet radiation has a ..... effect.

Ⓑ Give reasons for the following :

1. Water molecule is a polar molecule.
2. The occurrence of the aurora phenomenon.
3. Although sugar is a covalent compound, it dissolves in water.

### Question 2

Ⓐ Write the scientific term for each of the following statements :

1. A group contains the strongest nonmetals.
2. The environmental system that is affected severely by the absence of one species of living organisms that live in it.
3. The vertical columns in Mendeleev's table.

Ⓑ Calculate the height of a mountain if the temperature at its base is 30°C and at its top is –6°C.

Ⓒ Mention one difference between each of the following :

1. Simple and complicated ecosystems.
2. Natural and industrial water pollutants.



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## Question 3

**A** Choose from column (B) what suits it in column (A) :

| (A) | (B) |
|---|---|
| 1. Altimeter | a. The layer that has all the weather phenomena. |
| 2. Thermosphere | b. A suitable layer for airplanes flying. |
| 3. Troposphere | c. A device used to measure the altitude of planes. |
| 4. Stratosphere | d. The hottest layer in the atmospheric envelope. |

**B** What happens in the following situations ... ?

- Putting a magnesium strip inside a test tube containing oxygen.

**C** Correct the underlined words :

1. **The passenger pigeon** is from the birds that can't fly because of its small wings.
2. Each period ends with a **nonmetal**.
3. **The environmental systems** are safe places which are specified to protect the endangered species in their natural environments.

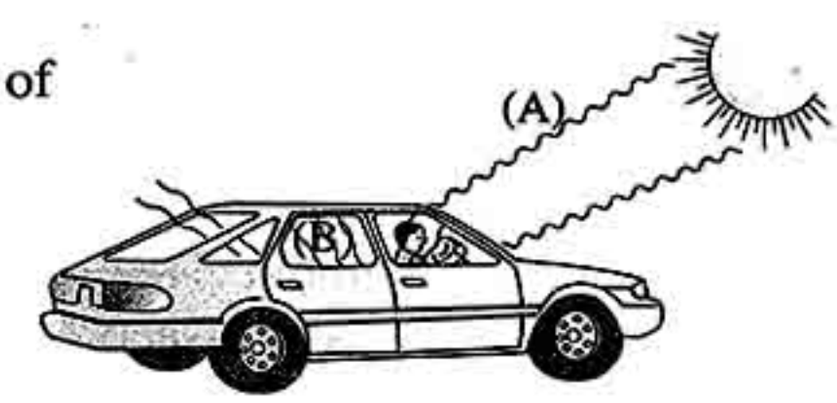
## Question 4

**A** Choose the correct answer :

1. ..... is an example of microfossils.
   a. Mammoth b. Ferns c. Foraminifera d. Archaeopteryx
2. The scientist ..... discovered the main energy levels in the atom.
   a. Bohr b. Mendeleev c. Moseley d. Hofmann
3. All of the following are endangered species except .....
   a. panda bear. b. bald eagle. c. quagga. d. rhinoceros.
4. Sodium oxide is from ..... oxides.
   a. amphoteric b. acidic c. nonmetallic d. basic

**B** The opposite figure shows a person in a car with closed windows :

1. Label the letters (A) & (B) that represent two types of electromagnetic waves.
2. What is the process expressed by this figure ?




**C** Define each of the following :

1. Chemical activity series.
2. Fossils.
3. Water pollution.



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PART 2

## 26 Suez Governorate — Directorate of Education and Teaching Inspect of Science

Answer the following questions :

### Question 1

**A Complete the following statements :**

1. The scientist ..... discovered the main energy levels in the atom.
2. Among the pollutants of the ozone layer are ..... compound that is used in air conditioning set.
3. Ultraviolet radiation has a ..... effect and the infrared radiation has a ..... effect.
4. Archaeopteryx represents the link between ..... and .....

**B What are the results of ...?**

1. Presence Van-Allen's belts.
2. Storing water in plastic bottles.

**C Write the scientific term :**

1. Metals are arranged descendingly according to their chemical activity.
2. The ability of the atom in the covalent molecule to attract the chemical bond electron to it.
3. The region where the atmospheric envelope merges with the outer space.
4. They are the remains or traces of organisms that lived in the past and were preserved in sedimentary rocks.

### Question 2

**A Give reasons for :**

1. Alkali metals are kept under kerosene in the lab.
2. The lower part of the stratosphere is suitable for airplanes flying.
3. Presence of hydrogen bond between water molecules.
4. Ionosphere is important for radio stations.

**B Choose :**

1. When sodium reacts with water, ..... gas evolves.
   a. $O_2$ b. $CO_2$ c. $H_2$ d. $N_2$
2. Ozone layer is measured in a unit called .....
   a. km. b. Dobson. c. nm. d. $mm^3$.
3. Complete fossils of insects are found preserved in .....
   a. ammonites. b. amber. c. igneous rocks. d. ambergris.
4. All of the following are endangered species except .....
   a. panda bear. b. bald eagle. c. quagga. d. rhinoceros.



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**C Study the opposite figure, then answer :**

What is the symbol (s) which indicate (s) the :

1. Inert gases.
2. Alkali metals.
3. Halogens.

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | N |
| A | | | | | | | | | | | | | I | K | | L | |
| | C | | | | | | | | | | | H | | | | | O |
| B | | | | D | | | E | | F | | G | | J | | | M | |

## Question 3

**A What happens when ... ?**

- Adding the purple Sunflower solution to a jar has a piece of burning coal. [Write the symbolic balanced equation].

**B Correct the underlined words :**

1. The elements in **Mendeleev's** table are arranged according to the increase of atomic numbers.
2. **The radioactive cobalt** is used in preservation of cornea of the eye.
3. Element which its atomic number is **12** lies in period four and group (2A).
4. **Fluroine gas** is used as an insecticide to preserve stored agricultural crops.
5. **Nobel gases** are elements which have both properties of metals and nonmetals.

**C During the electrolysis of acidified water, the volume of the gas which increases the glowing of burning fragment when approaching is equal to 7 $cm^3$ :**

1. What is the name of this apparatus in the process of electrolysis ?
2. What is the gas name ? and it evolves at ..... pole.
3. Write the balanced symbolic equation of this reaction.

## Question 4

**A Write the symbolic balanced chemical equations that indicate the following reactions :**

1. Magnesium with hydrochloric acid.
2. Chlorine gas with potassium bromide solution.

**B What do you expect when ... ?**

1. Absence of one of its species from the simple ecosystem.
2. Establishing natural protectorate.

**C If the temperature at the base of Mountain Everest is 20°C. How much is the temperature at its top if the mountain height is 8 km.**

**D What is meant by ... ?**

1. Extinction.
2. Global warming phenomenon.



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PART 2

## 27 Beni-Sueif Governorate — Official Language Schools Directorate

Answer the following questions :

### Question 1

**A** Complete the following statements :

1. Mendeleev arranged the elements ascendingly according to ....., while Moseley arranged them ascendingly according to .....
2. Sodium is kept under the surface of ..... to prevent it from the reaction with .....
3. Troposphere contains about ..... % from atmospheric envelope mass and about ..... % from atmospheric water vapour.
4. When the density of greenhouse gases increases in the Earth's atmospheric envelope, it allows the passage of ..... and .....
5. Fossils are traces and remains of ..... organisms that are preserved in ..... rocks.
6. From the extinct animals in the old ages are ..... and .....

**B** Calculate the height of a mountain if the temperature at its base is 30°C and at its top is (–9°C).

### Question 2

**A** Give reason for each of the following :

1. Mendeleev left gaps (empty places) in his periodic table.
2. Importance of fossils in petroleum exploration.
3. Increasing the size of ozone hole in September every year.

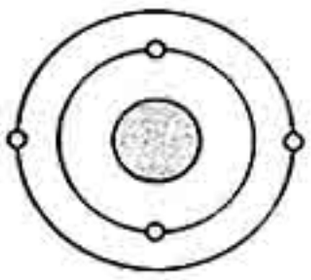
**B** Locate the position of these elements in the modern periodic table :

1. $^{20}_{10}Ne$ 2. $^{40}_{20}Ca$

**C** Study the opposite figure that shows the electronic configuration of element (x) in the modern periodic table :

- Deduce the atomic number of the element that follows that element in :

1. The same period. 2. The same group.



### Question 3

**A** Choose the correct answer :

1. The number of known elements in the modern periodic table till now is .....
   a. 217 b. 316 c. 16 d. 118
2. The 3rd period starts with elements their oxides as the following .....
   a. basic, amphoteric, then acidic. b. acidic, basic, then amphoteric.
   c. acidic, amphoteric, then basic. d. basic, acidic, then amphoteric.



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3. ..... in its salt solutions.
   a. Chlorine replaces bromine
   b. Bromine replaces fluorine
   c. Iodine replaces chlorine
   d. Iodine replaces fluorine

4. After solidification of the resinous matter secreted by pine trees in the old geological periods, it forms .....
   a. amber fossil.
   b. fossil of a complete body.
   c. trilobite fossil.
   d. nummulites fossil.

5. ..... is the second layer of atmospheric envelope.
   a. Troposphere
   b. Stratosphere
   c. Mesosphere
   d. Thermosphere

6. ..... is used as an insecticide to preserve stored agricultural crops.
   a. Methyl bromide gas
   b. Halons
   c. Nitrogen oxide
   d. Freon

7. Worm's tunnels fossil is formed because of .....
   a. the presence of hard skeleton.
   b. the activity of worms during its life.
   c. the death of the worms themselves and quickly buried in sedimentary rocks.

8. ..... protectorate is the first established natural protectorate in Egypt.
   a. Saint Cathrine  b. Ras Mohamed  c. Wadi Hetan  d. Petrified forest

**B Mention one use of each of the following elements :**

1. Cobalt 60.
2. Liquefied nitrogen.

## Question 4

**A Write the scientific term :**

1. The block that contains the series of lanthanides and actinides.
2. A charged layer reflects radio waves.
3. Thinning or losing parts of ozone layer above the south pole.
4. Fossils of organisms that had lived for a short period of time in the past and had a wide geographic distribution.

**B Mention one difference between each of the following :**

1. Complicated ecosystem and simple ecosystem.
2. The benefits (or characteristics) of Ras Mohamed protectorate and Wadi Hetan region.

**C Write the balanced chemical equation which expresses the following reaction :**

Carbon dioxide with water.



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PART 2

## 28 El-Minia Governorate — Administration of Distinguished and Governmental Language Schools

**Answer the following questions :**

### Question 1

**A Complete the following statements :**

1. Fossils are found in ..... rocks.
2. ..... is the region between stratosphere and mesosphere.
3. Metal oxides are called ..... oxides, while nonmetal oxides are called ..... oxides.
4. Ultraviolet radiations have ..... effect, while the infrared radiations have ..... effect.
5. The scientist ..... discovered the main energy levels in the atom, but the scientist Rutherford discovered .....

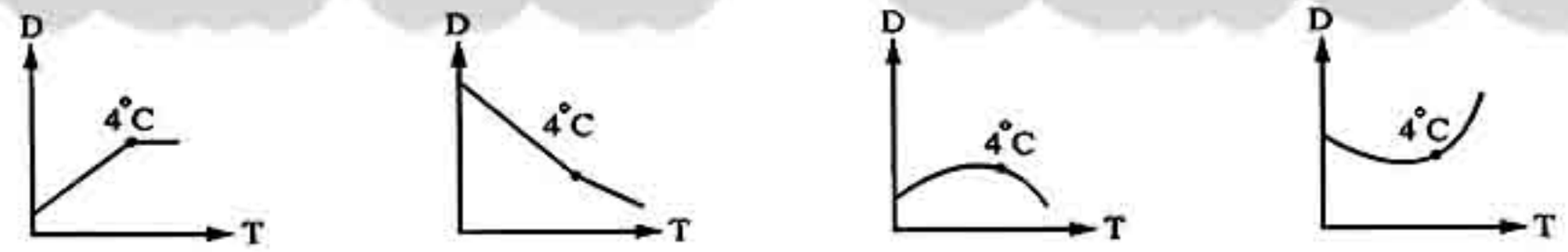
**B Write the balanced chemical equations :**

1. The formation of ozone gas.
2. Reaction between chlorine gas and potassium bromide.

### Question 2

**A Choose the correct answer :**

1. The element which locates in period (3) and group (3A) is .....
   a. $_{13}Al$ b. $_{5}B$ c. $_{11}Na$ d. $_{15}P$
2. All of the following gases are greenhouse gases except .....
   a. $CO_2$ b. $N_2O$ c. $O_2$ d. $CH_4$
3. The figure ..... represents the change of water density by changing the temperature.




a. b. c. d.

4. The air moves ..... in the stratosphere layer.
   a. horizontally b. vertically c. inclined d. no correct answer
5. Complete body fossils of insects are found preserved in .....
   a. ammonites. b. amber. c. igneous rocks. d. scorpion.

**B Give reasons for :**

1. Water molecules are from polar compounds.
2. The atomic size increases through group.



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## Question 3

**A Write the scientific term for each of the following statements :**

1. Curved lines that join the points of equal pressure in the atmospheric pressure maps.
2. The halogen which exists in a solid state.
3. Thinning or losing parts of ozone layer.
4. Elements that have properties of metals and nonmetals.
5. A type of ultraviolet radiations that is absorbed completely 100 % in ozone layer.
6. Arrangement of metals in a descending order according to their chemical activity.

**B Problem :**

If the temperature at the top of a mountain is 17°C.
Calculate the temperature at its base if the mountain height is 2000 m.

## Question 4

**A Correct the underlined words :**

1. **50%** of the mass of the atmospheric envelope is present in the area between the sea level and 13 km elevation.
2. **Cobalt 60** is used in preservation of cornea of the eye.
3. Elements of "p" block are organized in **5 groups**.
4. **Chemical pollution** of water causes typhoid and hepatitis.
5. Extinction of some polar animals is from the **positive effects** of global warming phenomenon.

**B What happens when adding HCl to the following elements ... ?**

1. Copper.
   (Write the chemical equation).
2. Magnesium.

# 29 Assiut Governorate — Administration of Distinguished and Governmental Language Schools

**Answer the following questions :**

## Question 1

**A Complete the following statements :**

1. Drinking water has high ratio of ..... which causes the death of brain cells.
2. The atmospheric layer containing most of the water vapour is .....
3. The number of electrons in the outermost energy level indicates ..... number.
4. There are ..... bonds between water molecules, while the bonds between atoms in water molecules are ..... bonds.



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الصف الثانى الاعدادى موقع ذاكرولى التعليمى كتاب المعاصر

PART 2

**B Write the measuring unit of :**

1. The wavelength of ultraviolet rays.
2. Atmospheric pressure.

**C Locate the position of the following elements in the modern periodic table :**

1. $_{13}Al$ 2. $_{10}Ne$

## Question 2

**A Choose the correct answer :**

1. The element which its atomic number equals 17 is similar to that of atomic number equals .....
   a. 7 b. 19 c. 9 d. no correct answer.
2. Elements in d-block are called .....
   a. alkaline Earth metals. b. halogens.
   c. transition elements. d. alkali metals.
3. The coldest layer in the atmosphere is .....
   a. mesosphere. b. stratosphere.
   c. ionosphere. d. thermosphere.
4. Complete body fossils of insects are found preserved in .....
   a. amber. b. ambergris.
   c. igneous rocks. d. no correct answer.

**B State using equations :**

- How to obtain $H_2$ by using three different methods.

**C Mention the importance of :**

1. Van-Allen belts. 2. Cobalt 60

## Question 3

**A Correct the underlined words :**

1. Elements of group (1A) are known as **inert gases**.
2. Each period ends with a **nonmetal**.
3. Archaeopteryx links between reptiles and **mammals**.
4. The **halons** are produced from burning supersonic airplanes.

**B Compare between :**

1. Fluorine and cesium [according to chemical activity].
2. Near ultraviolet rays and far ultraviolet rays [according to wavelength].

**C Write the balanced chemical equations which express the reaction of :**

1. Carbon dioxide with water. 2. Halogen with metallic element.



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## Question 4

**A** Write the scientific term :

1. The apparatus which is used for electrolysis of water.
2. The scientist who discovered the presence of protons in the nucleus of the atom.
3. The series in which metals are arranged in a descending order according to their chemical activity.
4. Non-flying bird which became extinct.

**B** Give reasons for :

1. Mendeleev left empty places in his table.
2. Ionospherer layer is important for wireless communications.

**C** Calculate the temperature at the top of a mountain with a height 8000 m if the temperature at Earth's surface equals 22°C.

# 30 Sohag Governorate — Science Department

Answer the following questions :

## Question 1

**A** Complete the following statements :

1. Ultraviolet radiation has ..... effect, while infrared radiation has ..... effect.
2. The highest temperature layer in the atmosphere is ..... and the least temperature is .....
3. Archaeopteryx fossil links between ..... and .....
4. Desert is an example of ..... ecosystem, while tropical forest is an example of ..... ecosystem.

**B** Give one use for :

1. Aneroid.
2. Liquid sodium.
3. Index fossils.

**C** Calculate the height of a mountain if the temperature at its base is 30°C and at its top is (–9°C).

## Question 2

**A** Give reasons of the following :

1. Increase $CO_2$ gas ratio in the atmosphere.
2. Water molecule is from polar molecules.
3. Elements of group (1A) are known alkali metals.
4. The lower part of the stratosphere is suitable for flying airplanes.

**B** Locate the position of the following elements in the modern periodic table :

1. $_{20}Ca$
2. $_{3}Li$
3. $_{8}O$



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PART 2

**C Write one example for :**

1. A complete body fossil.
2. A metal reacts very slowly with cold water.
3. An animal extinct in old times.

## Question 3

**A Choose the correct answer :**

1. All of the following are greenhouse gases except .....
   a. $CO_2$ b. $N_2O$ c. $O_2$ d. $CH_4$
2. The atmospheric pressure on the top of a mountain is ..... the atmospheric pressure at sea level.
   a. more than b. less than
   c. equal to d. no correct answer
3. In the periodic table, the elements which are identical in properties lie in the same .....
   a. period. b. group.
   c. nucleus. d. no correct answer.
4. ..... is used in food preservation.
   a. Cobalt 60 b. Silicon
   c. Liquefied nitrogen d. No correct answer

**B Write the chemical equation for each of the following :**

1. Reaction of sodium with water.
2. Reaction of magnesium with hydrochloric acid.

**C Correct the underlined words :**

1. Pure water in normal atmospheric pressure boils at **70°C**.
2. Petrified wood is considered from **rocks**.
3. The physical state of iodine is **liquid** state.

## Question 4

**A Write the scientific term :**

1. The apparatus which is used in water electrolysis.
2. Weight of air column of atmosphere height on a unit area.
3. It is a phenomenon that appears as brightly coloured curtains seen from both poles.
4. A descending arrangement of elements according to their chemical activity.

**B Compare between :**

1. Mendeleev's periodic table and Moseley's periodic table [according to the arrangement of the elements].
2. Acidic oxides and basic oxides [according to dissolving in water].

**C Find the atomic number for the following elements :**

1. Element X lies in third period and group (6A).
2. Element Y lies in the fourth period and group (2A).



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